40 Roch (c)

POPULAR Computing WEEKLY

THIS WEEK'S SOFTWARE SEE PAGE 70

35p 10-16 November 1983 Vol 2 No 45

This Week

The Word
Mike Grace looks at a word processor plus 80 column board for the Commodore 64. See page 16

Ant Attack
David Kelly talks to Sandy White, author of 3D Ant Attack. Page 12

Filing system
Sam Knowles presents a filing program that can be used on cassette or Microdrive for 48K Spectrum. See page 28

New Releases
All the latest software including Morris meets the Bikers from Automata and Doom Bugs from Work Force. Page 68

★ STAR GAME ★
Walk on the Wall on Commodore 64. See page 10.

News Desk

Acorn shoots itself in foot

ACORN has run into serious problems with its Electron computer.

With retailer orders according to Acorn over the 150 000 mark, the company has been able to do little else than supply a trickle of demonstration models to dealers in the two months since the Electron was launched. Software too — the 12 titles announced with the Electron — is nowhere in sight.

This despite claims earlier this year by Acorn's joint managing director Chris Curry that

Continued on page 5

IBM announces Peanut Junior

AS expected, IBM has announced its Peanut home computer — to be called the PC Junior.

The machine, very like a cutdown IBM PC, is expected to be in the shops in North America and Canada early in the New Year but, at present, there are no plans to sell the machine in the UK.

As was the case when the PC was announced, only a version compatible with the American tv standard is available, and it is expected to be some time before a PAL version will be manufactured for the UK.

The PCjr is based on the same chip as the PC — the 16-bit 8088, and it will be available in two versions.

The PCjr Entry model has 64K Ram and costs $669 (around £450). The PCjr Expanded model has 128K Ram, includes a built-in 5¼ inch disc drive, with 360K dual sided, double density discs and will sell for $1 269 (around £850). The Entry model is capable of being up-graded to the Expanded version.

Otherwise, the two models are identical. Neither has a built-in display but the PCjr will work with an ordinary tv or monitor.

Both have 64K Rom which includes Basic and both feature a separate keyboard connected to the main unit by an infra-red link. The link operates in a similar way to a remote tv controller and has a range of about 20 feet. A cord

Continued on page 5

Continued on page 61

BRITAIN'S BEST-SELLING MICRO WEEKLY

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This Week

Editorial

The ubiquitous International Business Machines (IBM) has spawned yet another computer.

PCjr, known before its debut as Peanut, arrived in New York last week after months of speculation as to its specifications and capabilities in the event there were few surprises, though the keyboard is physically separated from the computer and linked only by an infrared device.

Like its elder brother the IBM PC (perhaps IBM will now rename it the PCsr?), the PCjr is a considerable departure from IBM's usual territory of mainframes and minis. Based on the same 16 bit microprocessor as the PC, the PCjr comes in two different models costing $669 or $1,269. The more expensive model includes extra memory, two cartridge slots and a disc drive and is likely to compete with machines such as the Apple IIe. The cheaper model is aimed at the top end of the home computer market currently dominated by Commodore in the US.

The PCjr will not go on sale in the US until the beginning of next year, and is unlikely to appear in the UK for at least nine months after that.

Both Acorn and Sinclair, who are planning to release business machines in the first half of next year will be watching the PCjr closely.

Next Thursday

Split second reactions are needed in Crossfire, next week's star game for the BBC B by Abdul Nathekar. In this two player, joystick operated, game, you must place your crosshair sight over your opponent's and fire before he does. The first player to score 10 points wins.

martech games ...a spectacular range of software

BLASTERMIND — SPECTRUM 48k £5 50

At first glance this might seem to be just another version of a very popular game How wrong can you be!! True the start is simple enough The Spectrum picks a code of numbers or colours with a selection of levels of difficulty — and invites you to do the same You then take it in turns to guess each others code from the clue supplied after each guess An extremely well written fast and very clearly displayed game with almost inevitable defeat

This was exactly as intended but unfortunately *something went wrong* During the programming strange uncomplimentary messages began to appear on the screen At first they were so few they were not taken too seriously but soon they could no longer be ignored Somehow the Spectrum had been given a personality — a rather devious superclious dislikeable hateful, horrible mind

✱ Side B contains a version of the game compatible with the excellent Currah µSpeech unit — even worse!! ✱

THE QUEST OF MERRAVID — VIC 20 (16k) £7 95 or Commodore 64 £7 95

A really challenging and enjoyable adventure written by a confirmed adventure addict who grew tired of the ease with which he solved other adventures himself Will accept and act on sentences containing up to nine words

The adventurer becomes Merravid charged with the task of finding taking and then returning the magic Firestone of the Dwarves However overcoming the many novel and original hazards is no easy matter Careful and imaginative thought is required if progress is to be made and the Firestone tracked down to the lair of the Dragon of Thargon Even then the Dragon has to be defeated and the stone retrieved A compulsive extremely enjoyable and very user friendly adventure

HARRIER ATTACK — any ORIC - 1 £6 95, any SPECTRUM £5 50

Pure machine code super-fast action packed highly addictive arcade-style game requiring great skill The harrier takes-off from an aircraft carrier and flys over seaborne defenses to attack enemy installations on a nearby island The harrier may fly faster slower higher or lower and has bombs and cannon fire with which to protect itself and make its own attack If it flies too high it is detected by enemy jet fighters (which it may counter attack) — so it needs to hug the mountainous terrain which also varies with every new game But the island is heavily defended by anti-aircraft rockets and tanks which again the harrier may counter attack or try to fly through A tally is kept of fuel speed altitude ammunition plus player score and high score Finally the harrier must make its bomb run over the enemy base before returning past more hostile shipping to its own carrier

SCUBA DIVE — any ORIC - 1 £6.95, SPECTRUM 48k £5.50

Pure machine code with super cartoon graphics You are in control of a diver who must swim down through jellyfish sharks barracuda and a host of other under sea nasties to locate the entrance of a submarine cave He must then follow its twisting and branching passages which change with every new game to locate the magical giant oysters with their fabulous treasure of enormous pearls Many of the passages lead to dead-ends while some are filled with horrible underwater monsters Each dive has to be timed carefully so that there is enough oxygen left for the return journey which is further frustrated by the diver's boat shifting anchor and threatening to decapitate him with its propeller This game which features three divers player score high score hall of fame and sound effects presents perhaps the ultimate epic arcade adventure



JUNGLE TROUBLES — frustrating addictive funny silly Come back Tarzan — all is forgiven! SPECTRUM £5.50
GALAXY 5 — five games on one tape for any ORIC -1 £6 95
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Telephone: (0323) 768456 Telex 87465 EXIM Brighton

Paanuts Jr

Continued from page 1

connection can also be used

The PCjr has twin cartridge ports (the PC has none) cassette port twin joystick ports modem and interface light-pen port tv and composite video outputs RS232 serial interface and an additional I/O bus Options include a thermal printer priced at $175 joysticks and 64K Ram pack

Most programs available for the PC will run directly on the PCjr although the up-dated 2 1 disc operating system may cause some difficulties

A number of software cartridges have also been announced for the PCjr — mostly games *Crossfire Mineshaft Mouser* and *Scuba Venture* There is also an extended Basic cartridge

IBM hopes to produce 20 000 machines for the US and Canada this year — only enough to supply each dealer with 15 machines Although IBM plans to make over 300 000 PCjrs next year, the company s manufacturing capacity is already severely stretched by the run-away success of the earlier PC model PCjr may not therefore, be available in the US in volume until wall into 1984

Acorn

Continued from page 1

the delays and production problems which characterised the early days of the BBC machine would not befall the Electron

Even WH Smith the only High Street chain to be offering the computer has received but a few machines A WH Smith spokeswoman said "We are having to disappoint customers — we are not able to supply demand What we have had has sold out and while we are expecting more deliveries the amount will still be well below demand "

The problems all appear to stem from serious production difficulties at Astec in Malaysia at present the only Electron manufacturer

Acorn has quickly looked for alternative manufacturing sources and has found Hong Kong manufacturer Wongs and South Wales AB Electronics

Unfortunately the first Wongs Electron will not come off its far east production lines until the end of November and AB will not get going until early 1984

Chris Curry

So it seems the situation is unlikely to improve before Christmas and unfortunately many of Acorn s orders from retailers are conditional on their being fulfilled before Christmas In the words of one industry source — Acorn would appear to have shot itself in the foot

There isn t a problem with manufacture — they just can t make enough explained an Acorn spokesman The production line target is 25 000 a month As they ramp up to that there is no way that they will clear the backlog

Aquarius is still alive and kicking

THE Aquarius computer recently abandoned by troubled Mattel is far from dead

Its Hong Kong manufacturer Radofin which is to take over selling the machine when Mattel bows out later this year has announced two new machines

The Aquarius 2 will be launched in January to be followed by a more up market Aquarius 3 machine in April Both computers will be compatible with the present range of Aquarius cartridge software and peripherals

Aquarius 2 will be very similar to the existing Aquarius 1 machine but with a full-size full-travel keyboard and additional Ram It will have 4K on-board plus an additional 16K or 32K either on-board or as a plug-in cartridge

The Aquarius 3 will have 64K Ram and be a competitor for machines like the Commodore 64 computer

No prices have yet been decided for two of the new machines Radofin s managing director Alan Leboff commented I could guess, but there are too many hazards in doing so at this stage — who knows what will happen between now and the New Year?"

Glasgow micro show

THE Scottish Home Computer and Electronics Show will be held at the Anderston Exhibition Centre in Glasgow from November 11 to 13 The show is open from 12 noon to 8 pm on Friday 10 am to 6 pm on Saturday and 10 am to 5 pm on Sunday Admission is £1 and 50p

Irish Spectrum protection

DUBLIN-based software house Micro-Kraft has developed a range of software protection systems for Sinclair Spectrum programs

Three software packages have been developed — *Basic Protectrum*, *Machine code Protectrum* and *Anti-copier Protectrum* — designed to help software authors protect their work

In each case, the *Protectrum* program is loaded into the Spectrum followed by the software to be secured The degree of protection required is then selected from a menu and the secured program is then saved out to tape in the normal way

Basic Protectrum contains seven security systems to prevent merging listing to screen or printer to corrupt the program if edited to store the program as junk on tape and to disable the *Break* key *Basic Protectrum* will be available in December

Machine-code Protectrum performs as for the *Basic Protectrum*, but for machine code programs and *Anti-copier Protectrum* secures software against the use of so called breaker programs The latter is claimed to work against all known copier programs These two programs will be available in January 1984

The *Protectrum* series is priced at £5 95 More details from Micro-Kraft 48 Seacourt, Clontarf Dublin Eire

Mettoy struggles no more

METTOY, the struggling Corgi-toy giant which originally developed the Dragon 32 computer, has gone into receivership

It was Mettoy's continuing financial problems which forced the company to sell off its Dragon 32 computer venture to Dragon Data in November last year retaining only an 18 percent share

In September this year when Dragon itself ran into cash flow problems Mettoy was unable to contribute to a £2 5m rescue plan and its shareholding in Dragon was further diminished to 15 5 per cent

Brian Moore

Now Mettoy s receivers will be looking for a buyer for the company s share of Dragon but so far no likely candidates have emerged

Commenting on Mettoy s failure, Dragon Data s new managing director Brian Moore, appointed after the Prutech rescue in September, said 'Dragon Data is a fully independent company and the news of Mettoy s receivership can have no significant effect on the running of this company

Mettoy's collapse has long seemed probable At the end of 1982 the company s debts stood at £10 5m Deloitte Haskins and Sells have been appointed as receivers

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cable software

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The Trojan Light Pens have received great reviews throughout the computer trade and are undoubtedly the finest light pens available for Spectrum and Dragon owners

The advanced software enables you to draw pictures on to your TV screen create your own designs and save and reload from tape No experience of programming is necessary as the Trojan Light Pen comes complete with a new advanced program cassette and comprehensive instructions

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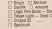
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Name

Address

LETTERS

No offence

I am sure that A Pidgeon meant no offence to be taken from the title of his program 'The Drumming Native' (*PCW* 29 September 83)

The misuse of the word Native to mean dark skinned person of primitive mean' however could upset many of your readers

Within living memory, it was the habit of certain colonialists to address mixed race gatherings as 'Ladies, Gentlemen and Natives' with all the implied disrespect intended. The definition of the word (Latin nativus (Nationtive)) would indicate that even A Pidgeon is a native — of somewhere!

A title such as 'War drums' would have been much more suitable without overtones of ethnic bigotry

Patrick Langford
PO Box 152
Nyeri
Kenya

Certainly no offence was intended and if any was taken we apologise

Waste of space?

I would like to agree with a recent letter about high score charts

You should publish the more popular ones, eg, the ones that appear in the Top 10 frequently

I would like to complain about the amount of space which is used up by the silly picture in the star game. Surely this space could be put to better use (a machine code section)?

Not wishing to be a moaner, but who in the world handles your classified advertisements? For instance, why do you manage to get Spectrums under ZX81s for sale and what is *Trantam* or *Vetpac* surely you mean *Transam* and *Jet Pac*?

PS My high scores are 40,685 for *Pssst* after revealing Robbie's Ultimate dream and 142,110 for *Zzoom* after surviving 14 attacks, saving 244 refugees and getting past the aircraft carriers

Craig Mitchell
28 Kirkstell Road
Hollin
Middleton
Manchester M24 3EU

There definitely seems to be a groundswell of support for high score charts. To use an old phrase 'watch this space'

We actually rather like the star game illustrations, but we would be interested to know what other readers think

As for the classified advertisements, we're afraid that a few mistakes do creep in from time to time. However, we are doing our best to rectify them

Screen displays

In response to the letter from Kevin Jenkins (*PCW* 27 October-2 November) the solution to his problem of recording screen displays on to videotape is simple

Instead of plugging the computer's aerial lead into the tv, connect it to the aerial socket of the video recorder. The video recorder should then be connected to the tv in the normal way. Next by tuning a spare channel on the video recorder, you will be able to produce a clear image on the tv screen

The VCR can now be used to record any image appearing on the tv screen, eg, listings, screen displays

You can even record games as you play them, and then watch the action replay on video!

Perhaps this could be an infallible (albeit expensive) way of authenticating high scores should the demand for a table prove worthwhile

John Clifton
69 Davison Drive
Cheshunt
Herts
EN8 0SX

Arcade corner

Having read Jonathon Whitehouse's letter (*PCW* 27 October to 2 November) I would like to offer my views on the subject of a games high score table

First, a printer dump would be impossible in the case of most commercial games, which are unstoppable, and may easily be forged. It would be more difficult to forge a photograph perhaps, but still not infallible. So I would suggest a photograph together with the signature of a witness to the score

I agree that only one game should be selected for each computer (or memory size), otherwise there would be little room in your magazine for anything else. As to the selected games perhaps best-sellers should be chosen. A few suggestions are *Jet Pac* or *Arcadia* for the 16K Spectrum, *Manic Miner* for the 48K Spectrum, *Planetoid* for the BBC B, any of the Acornsoft 'Arcade Action' games for the BBC A, *Donkey King* for the Dragon, *Xenon* for the Oric, *Grid Runner* for the Vic20, *Preppie* for the Atari, *3D Defender* for the 16K ZX81 and so on

While on the subject of arcade games how about a page similar to Tony Bridge's adventure page? The score tables would be the central feature of this, but need only appear every two or three weeks

I am not a great arcade fan, but enjoy the odd game and feel that, having seen the scope of the adventure page, an arcade page would have a lot to offer

Another welcome feature would be a 'Manic Miner Hall of Fame', similar to Tony Bridge's list of *Hobbit* solvers

Raymond Blake
32 Derwent Avenue
Rayleigh
Essex SS6 8LE

An arcade game page is a very interesting idea. Anyone who would be interested in contributing to such a page, or who has comments to offer on possible format, please drop us a line

Zero score

Upon reaching 1 000,000 on *Jet Pac*, my score returned to zero. Is this a bug, or is it because there is not enough room on the screen for it? I got 5,455 more points so my high score is 1,005 455 (beat that)

Also in reply to Jonathon Whitehouse's letter on a high score table, I think it would be a great idea

Adrian Byrne
140 Nutley
Hanworth
Bracknell
Berks RG12 4HF

Kong bug

I have found a bug in Ocean's excellent game *Kong*. If you go behind the last ladder on the bottom floor and wait until the bonus gets to 00000 and then rescue the girl, your score will then go up to about 65,000 instead of about 1,600

Richard Couchman (12)
22 Kings Hedges
St Ives
Huntingdon
Cambridgeshire

Extraordinary uses

We are planning a series of television programmes on the use of microcomputers and are looking for two groups of people — first celebrities who love messing with their micros, and secondly any micro maniacs who have developed extraordinary uses. We do want extraordinary uses — not just unusual games but blowing up ballons or feeding the dog

Can any of your readers help us, I wonder? If so perhaps they could write to me direct

Adam Hart-Davis
Producer
Yorkshire Television
The Television Centre
Leeds LS3 1JS

Pssst is tops

I buy your computer magazine every week and I always turn to the 'Top 10 games feature, but I have never seen the game *Pssst* by Ultimate in the Top 10 for the Spectrum. I have this game and I think it is better (nearly) than *Jet Pac* or *Cookie*

If anybody else feels the same way as me, I think they should write to you

Edward Beard
100 Burnt Ash Road
Lee
London SE12 8PU

MR CHIP SOFTWARE

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WHEELER DEALER

As for the Commodore 64, but now available for the 48K Spectrum, Texas T I 99/4A and Dragon **£5.50**

VIC 20
GAMES AND UTILITIES

JACKPOT

This is it the ultimate Fruit Machine for the VIC with nudge, hold and respin 100% machine code "Overall Jackpot is a beautifully written simulation giving superb graphics, animation and use of colour In fact, this program makes Commodore's Fruit Machine cartridge look unbelievably cheap and nasty" Home Computing Weekly No 20 19/7/83 . . **£5.50**

KWAZY KWAKS

Accuracy and speed are required for this Shooting Gallery, superb use of colour and graphics in this new and challenging game from the author of **Jackpot** 100% machine code joystick or keyboard control **£5.50**

PACMANIA

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Guide your ever hungry snake round the screen eating the flies and wasps, to stay alive you must avoid the deadly mushrooms, quick reactions are required for this biting game, keyboard control for the unexpanded VIC **£5.50**

BUGSY (Joystick Only)

This is a Minefield with a difference as you step on the stones whilst collecting purple boxes which give you both time and points, they disappear from beneath your feet DO NOT DESPAIR! "BUGSY" will randomly replace the stones but avoid bumping into him or its sudden death! An original compulsive and challenging game **£5.50**

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COMMODORE 64
GAMES AND UTILITIES

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Walk on the Wall

A new game for Commodore 64 by S Semiee

This game is for the Commodore 64 + joystick. It looks very easy to start with, as all you have to do is get your man from one side of the the wall to the other. Of course, it's not that easy.

You have to jump over the gaps in the wall and avoid the flying insects. You score 50 each time you reach the end of the wall, but lose 10 each time you fall off!

Notes

4	CLEARS SCREEN AND GOES TO THE TITLE AND INSTRUCTIONS
11 16	MOVES 64 CHARACTERS FROM ROM TO RAM
100	RESETS CHARACTER STARTING LOCATION TO 12288
105-118	READ DATA FOR SCREEN DISPLAY
125-127	DATA FOR GRAPHICS
130 292	PRINT AND POKE WALL ON TO THE SCREEN AND ADD COLOUR
602-620	GET AND READ SPRITE DATA
700-725	CHECK WHICH SHEET YOU ARE ON AND POKE THE CORRECT SPRITES ON THE SCREEN
730-735	SET VARIABLES AND LOCATIONS OF SPRITE DATA
800 1795	READ JOYSTICK IN PORT A AND MOVE SPRITE 0
1710 1740	SPRITE 0 PAST 255 POSITION POKE M S B
1790-1900	POKE SPRITES ON SCREEN CHECK FOR COLLISION MOVE SPRITES 1 AND 2
5000-6004	SUBROUTINES FOR MAN JUMPING
8000-8140	SPRITE DATA
11000-11940	SUBROUTINES FOR MAN WALKING DRAGONFLY AND MAN FALLING DETECT ANY COLLISIONS

Variables

L =	LIVES
SC =	SCORE
I =	SHEET NUMBER
OO =	HOW FAR THE MAN IS PAST THE INSECT
SO =	SID CHIP
V =	SPRITE CHIP
Y =	SPRITE 0 Y POSITION X=SPRITE 0 X POSITION
Y1 =	SPRITE 1 Y POSITION X1=SPRITE 1 X POSITION
Y2 =	SPRITE 2 Y POSITION X2=SPRITE 2 X POSITION



```
4 PRINT"J" GOSUB11900
5 PRINT"J"
11 POKE55 255 POKE56 47 CLR
12 POKE56334 PEEK(56334)AND254
13 POKE1 PEEK(1)AND251
14 FORI=0TO511 POKEI+12288,PEEK(53248) NEXT
15 POKE1 PEEK(1)OR4
16 POKE56334 PEEK(56334)OR1
80 L=8 SC=0 POKE53281 7
100 PRINT "J" POKE53272,(PEEK(53272)AND240)OR12 I=0 DD=120
105 SO=54272 POKESO+24,15 POKESO,37 POKESO+1 2 POKESO+5,0
110 POKESO+6,215 POKESO+7,37 POKESO+8,2 POKESO+12,10 POKESO+
   13 215
117 FORW=1024TO2023 POKEW,1 NEXT
118 FORW=55296TO56295 POKEW 7 NEXT
120 FORW=12288TO12295 READS POKEW S NEXT
121 FORW=12296TO12303 READS POKEW S NEXT
122 FORW=12304TO12311 READS POKEW S NEXT
123 FORW=12312TO12319 READS POKEW S NEXT
124 FORW=12320TO12327 READS POKEW S NEXT
125 DATA255 255,255 255 255 255 255 255,0 0,0,0,0,0,0,0
126 DATA255 254 254,254,254 254 254 0
127 DATA192 224 240,248 252 254,255,255
128 DATA0 2 2 0 0 0 0,255
130 PRINT"@@@@@@@@@@@@@@@@AAAAADAAAAAADAAAAAAADAAAAAAAAAAAA
   AAAAAA
131 PRINT"X333MCAAA333MCAAA333MCAAA3333333333333333",
132 PRINT"3333MAAA33333MAAA3333MAAA333333333333333"
133 PRINT"3333MAAA33333MAAA3333MAAA333333333333333"
134 PRINT"3333MAAA33333MAAA3333MAAA333333333333333"
201 FORW=1984TO1983 POKEW 2 NEXT
202 FORW=56056TO56255 POKEW,10 NEXT
210 V=53248
600 FORN1=12352TO12414 READQ1 POKEN1 Q1 NEXT
605 FORN2=12416TO12478 READQ2 POKEN2 Q2 NEXT
610 FORO=12480TO12542 READQ3 POKEO Q3 NEXT
615 FORPF=12544TO12606 READQ4 POKEPF Q4 NEXT
620 FORFF=12608TO12670 READQ5 POKEFF,Q5 NEXT
630 POKEV+39 6
700 IFI=0THENPOKEV+21,1 AA=230
720 IFI=1THENPOKEV+21,3 POKEV+39,6 POKEV+40,0 U=1
725 IFI=2THENPOKEV+21,7 POKEV+39,6 POKEV+40 0 POKEV+41,4 U=1
   XX=230
730 Y=149 X=20 Y1=140 X1=240 Y2=180 X2=X1
735 P=133 PP=135 BP=136
800 PE=PEEK(56321)
802 X2=X1
802 IFI=2THENPOKE2041 PP POKEV+2,X1 POKEV+3,Y1 POKE2042,BA
   POKEV+4,X2 POKEV+5,Y2
810 IFI=1THENPOKE2041,PP POKEV+2,X1 POKEV+3,Y1
850 IFY=149THENJ=0
900 IFPE=247THENX=X+8 GOSUB11000
1000 IFJ=0ANDPE=251THENX=X-4
1200 IFX<10THENX=10
1300 IFJ=0ANDPE=230THENGOSUB6000
1320 IFJ=0ANDPE=231THENGOSUB6010
1500 IFY<149THENJ=1 Y=Y+4
1700 IFX<255THENPOKEV+0,Y GOTO1750
1710 POKEV+1 150 POKEV+16,1
1715 FORB=0TO80STEP4
1717 POKEV+0,B
1718 GOSUB11000
1720 NEXTB
1730 POKEV+16,0 POKEV+0,0 POKEV+1,0 POKEV+21,0 A=PEEK(V+31)
   R=PEEK(V+30)
1731 RR=PEEK(V+30)
1735 I=I+1 DD=DD-10 SC=SC+50
1736 IFI=>3THENI=1
1738 IFDD<40THENDD=40
1740 GOTO700
1750 IFX1<10THEN1810
1751 IFX1<>10THENGOSUB11007
1755 POKE2040 P POKE2041 PP POKE2042,BA
1760 POKEV+1 Y POKEV+0 X
1801 A=PEEK(V+31) IFA=1THEN11010
1802 R=PEEK(V+30) IFR=3THEN11010
1803 RR=PEEK(V+30) IFRR=5THEN11010
1805 IFI=1THENX1=X1-5
1808 IFI=2THENX1=X1-5
1810 IFI=1ANDX1=<10ORX1<X-DDTHENX1=255
1815 IFI=2ANDX1=<10ORX1<X-DDTHENX1=208 X2=X1 Y2=124
1820 IFY1<>154ANDU=1THENY1=Y1+2 Y2=Y2-4
1825 IFY1=154THENU=2
1830 IFU=2THENY1=Y1-1 Y2=Y2+2
1835 IFY1=140THENU=1
1900 GOTO800
6000 IFI=0ANDX>10THENX=X-10 Y=Y-24 GOTO6004
6002 X=X-10 Y=Y-44
6004 RETURN
6010 IFX<252THENY=Y-20 X=X+2 RETURN
6020 RETURN
8000 DATA0 15,128,0,16,96 0,32 24,0,64,124
8010 DATA0 131,128,1,255,128 1,252,192 3 252 248
8020 DATA1 255,240,0 135,192,0 60,128,0,30,0
8030 DATA0 63,0,0,127 128 0 255,128,0,255,128,0,135,0
8040 DATA0 128,0,0,28 0 0,21,128,0,63 192
8045 DATA0 124,0 0 131,0 1,0,128,2 3,64,5,252,192,15,252,0,
   15,254 0,31 255
8050 DATA128 15,255 128,3,230 0,1,220,0,0,240,224,31,255,252,
   15 248 224 7 240
8055 DATA132 6,16 0 3,208,0,56 43,0,56,63,128,124,0,0 56,0,0
8060 DATA0,0 0 0 0,0,4 15,0 18 16,128,1,16,120 3,0 0 7 134 0
   15 156,0 3,187,136
8065 DATA0,128,64,0 120 64,0 120,96 0,187,144 0,28,0
8070 DATA0 0,0,0 0,0 0,0 0,0 0 0 0 0,0,0 0 0,0 0,0 0,0
8075 DATA0 0,0,0 28 0,56,34 0,128,28,0 76,188 0,7,128 0,3,
   236,0,1 34,0,0,252 0
8080 DATA0 120 0 0,48,0,0,24,64,0,15,128,0,7,0,0,0,0,0,0,0,0,
   0 0 0 0,0,0 0,0,0,0
8085 DATA0 0,0,0
8090 DATA0 0 0,0,0,0,0,0,0,0,0,0,0,0 0,30,0,0,40 0,0,35,0,0,
   1,128 0 1,192,0,2
8095 DATA224,0 4,240,0 0,192,0,17,196,96,10,151,128,12,163,0,
   0,224,0,0,0 0 0,0 0
8100 DATA0 0 0 0 0 0
11000 P=P+1 POKE2040,P POKESO+4,129 POKESO+4,130 FORT=1TO20
   NEXT
11002 IFX<255THENGOSUB11030
11003 P=P-1 POKE2040 P POKESO+11,139 POKESO+11,128 FORT=1TO20
   NEXT
11006 RETURN
11007 IFBP=196THENBP=BP+1 GOTO11009
11008 IFBA=137THENBA=BA-1
11009 RETURN
11010 FORF=YTOXX Y=Y+1 POKE2040 P POKEV+1,Y POKEV+0,X NEXTF
11012 FORT=1TO600 NEXT L=L-1 SC=SC-10
11013 IFSC<0THENSC=0
11015 POKEV+0 0 POKEV+1,0 A=PEEK(V+31) R=PEEK(V+30) RR=PEEK(
   V+30) POKEV+21 0
11020 IFL=0THENPOKE53272,(PEEK(53272)AND240)OR4 PRINT"J" GOT
   O11040
11025 GOTO700
11030 A=PEEK(V+31) IFA=1THEN11010
11031 R=PEEK(V+30) IFR=3THEN11010
11032 RR=PEEK(V+30) IFRR=5THEN11010
11034 RETURN
11040 PRINT"000 I TOLD YOU THAT WALL WAS SLIPPY YOU "
11045 PRINT"M FELL OFF EIGHT TIMES !!"
11050 PRINT"M                    HA-HA !!"
11052 PRINT"00 YOU SCORED ",SC,"POINTS.0"
11065 PRINT"M HAVE ANOTHER GO. TO PLAY AGAIN PRESS F7"
11066 PRINT"M   TO END PRESS E"
11070 GETA$ IFA$=""THEN11070
11075 IFA$="M"THENRESTORE RUN5
11080 IFA$="E"THENSYS64738
11085 GOTO11070
11090 PRINT"            A WALK ON THE WALL  "
11095 PRINT"M            BY S.N SEMLEY "
11096 PRINT"M    FOR THE COMMODORE 64 + JOYSTICK "
11100 PRINT        PRESS A KEY FOR INSTRUCTIONS"
11105 GETA$ IFA$=""THEN11105
11110 PRINT"J0 ALL YOU HAVE TO DO IS GET YOUR MAN     ACROSS
   THE WALL ",
11111 PRINT"                   (THE WALL IS VERY SLIPPY
   )M"
11115 PRINT"M MOVE YOUR JOYSTICK RIGHT TO MOVE RIGHT "
11120 PRINT"M MOVE THE STICK LEFT TO MOVE BACK "
11125 PRINT M  MOVE THE STICK FOWARD AND PRESS THE    BUTTON
   TO JUMP UP "
11130 PRINT"M  MOVE THE STICK RIGHT AND PRESS THE      BUTT
   ON TO JUMP UP AND MOVE",
11132 PRINT" RIGHT"
11133 PRINT"M T1PM AS SOON AS THE MAN HAS JUMPED LET    THE
   BUTTON GO "
11135 PRINT"                        M LOOK OUT FOR THOSE
   INSECTS M"
11136 PRINT"0M YOU SCORE 50 EACH TIME YOU GET ACROSS   THE
   WALL",
11137 PRINT" BUT LOSE 10 WHEN YOU FALL OFF."
11140 PRINT"M PRESS A KEY TO START THE GAME "
11145 GETA$ IFA$=""THEN11145
11150 RETURN
```

Travels with my ant

***David Kelly** talks to Sandy White, author of 3D Ant Attack*

Top-flight games programs never come out of thin air And *Soft Solid 3D Ant Attack* by Edinburgh sculptor Sandy White is no exception

He bought his first computer — a Mk14 — as long ago as 1979 At that time Sandy was at Edinburgh art college and he bought it with a view to controlling mechanical sculptings and simple robots

'I've always been fascinated by such things he says When he was about 12 he built a completely mechanical arcade game — you had to control the movement of a steel ball guiding it to the centre of a plywood maze to win a prize

At about the same time as he bought the Mk14, he started his four year course in sculpture "It started out as a standard course, he explains "They sent you off into clay and plaster But I sort of digressed I started sneaking bits of electronics into college connecting up motors to my sculptures to make them move

At first the designs were quite simple but Sandy soon started writing machine code routines on the Mk14 — the computer only understands machine code — to produce sequences of movements and lights

'The Mk14 didn't last long,' says Sandy I canibalised it to build a special project Then I got a Softie an Eprom Hex monitor — again machine code only After that somebody lent me an Acorn Atom

3D Ant Attack is the first game Sandy has written but it didn't start out as a game He first got interested in three-dimensional graphics He says I just love the computer graphics you see in tv commercials

"When I started on the *Atom* the only thing you can do from Basic is line-drawing graphics and even then it takes a long time to up-date each image making animation difficult

I thought it would be interesting to see if I could get it to draw faster and maybe shade in the line graphics shapes At that time I did a lot of experimenting with the algorithms needed for three-dimensional representation

But Sandy had to return the Atom to its owner which meant looking around for another machine He decided on the Spectrum and immediately had to start learning Z80 machine code to replace the 6502 code he had learnt for the Atom In February this year he took delivery of his 48K Spectrum

'It turned out that the Z80 was much better suited for my particular needs than the 6502 — some of the registers are 16-bit and the block search instructions run a lot faster on the Z80 Once I got used to it, the Z80 was quite an enlightenment

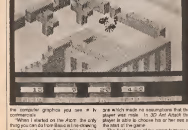
Having looked and worked at 3D representation in detail on the Spectrum Sandy chose to write a game "I'd been looking at other Spectrum games *3D Tanx* by John Ritman is drawn out in lines and although it is true 3D, it is slow to up-date the screen Also at that time there were a lot of games which claimed to be 3D but weren't

"I went through a lot of ideas before coming up with *3D Ant Attack* The final idea just evolved

Sandy was looking for something which made full use of his 3D techniques He was also determined to write a game to be played either by boys or girls 'There are a lot of sexist games around and I wanted one which made no assumptions that the player was male In *3D Ant Attack* the player is able to choose his or her sex at the start of the game

The final version of the game features a remarkable representation of 3D The character you control is able to walk round and hide behind buildings It is even possible to climb onto some of the constructions in the city to avoid being attacked by the extremely ferocious giant ants





At the start of the game the player stands outside the walled city of Antescher Jumping over the wall you must avoid the deadly ants to rescue a number of imprisoned unfortunates from various points within the city The further in you go the more difficult it is to return to freedom The primitive-looking townscape of buildings within the city walls are represented as shaded 3D blocks cylinders and pyramids

In a similar way to Atari's *Zaxxon* *Ant Attack* shows only part of the city at one time scrolling diagonally with the action An additional feature is a choice of view points Just as if you are a detached observer watching the proceedings from on high it is possible to choose your vantage point Selecting different keys gives four different views of the city When your hero or heroine disappears in one view, hidden behind a building it is possible to switch the viewing angle to look from the other side

"Viewing from different directions is really necessary If you are attacked by one of the giant ants behind a building it is vital to be able to change your view to find out what is happening

Every part of the city is represented on an XYZ co-ordinate system Each point of every building is held as three numbers by the computer The computer does a computation on the data to work out what is within the field of view at any point from a particular viewing angle The whole city is stored in memory but to save time the computer knows roughly which part of the city to look at to make up the picture you see The screen is up-dated 12 times a second

To make it run as fast as it does I had to think really carefully about the routines I used You have to watch down to the nearest machine-cycle what happens in a particular loop That took much longer than

anything else — just sitting down and trying to find the optimum code.

"In the end it was quite a panic to squeeze it all in. For the captions which come up from time to time I had to start modifying what they said just to fit them in.

"The city is not in colour. Apart from space limitations the main reason for that is that the time taken to work out the colour information would cause the game to run at approximately half speed."

The city was planned out on paper long before any programming began. Sandy's friend Angela Sutherland, also a sculptor, designed many of the actual buildings. All the different structures in the city have names because it was necessary to keep track of them when planning it out. Sandy had to write an entirely seperate program just for editing the design of the city, just like a real building site.

"I had to take care to avoid it looking too complicated. Too many buildings close together would mean you couldn't see between them easily."

Actual programming on *3D Ant Attack* took 15 weeks. "Writing the game once it was planned was incredibly tedious — like a punishment. I was crossing off the days on the wall like Robinson Crusoe waiting to get off his island. But there is no point in starting something if you don't finish so I pressed on. If I had known what it would be like I probably would never have started."

In the event, completion of the program was quite well timed — companies were just putting the finishing touches to their plans for Christmas. Sandy first went down to the shops in Edinburgh to find out which companies had the most titles on the shelves. From this simple research, Sandy decided to offer his program first directly to Sinclair. Unwilling to send out a copy of the actual game, he sent a video tape of the program down to Sinclair's software manager at Cambridge. They sent it back, explaining they didn't have a video recorder to play the tape on. Sandy was forced to think again!

Next he sent it to Quicksilva and they jumped at it. They flew Sandy and Angela down from Glasgow to Southampton the next day. And the rest is history, as they say.

Now Sandy has just started thinking about what to do next after a short holiday to recover from what he describes as "computer fatigue".

"There is nothing definite yet, but he is kicking a few ideas round. "The problem is coming up with a good enough game — I don't want to do another one unless what I can come up with is really much better than the first."

Sandy is also in the final stages of patenting his 3D code routines. "Usually it is more or less impossible to protect computer software, but I have been very lucky — the ideas behind the three-dimensional techniques I use are not necessarily applicable only to computers and the patent specification covers new ways of making 3D images."

So Sandy is now looking to licence his three dimensional routines for use by other programmers. "I may licence the package to any manufacturer who is interested, but in the meantime I shall hedge my bets by producing other games myself.

"Three dimensional graphics with colour is one possibility. I said before that it would be very slow, but I've got a couple of ideas.

"Also I'd like to explore some 3D ideas that aren't games. I had to write a game to sell my 3D routines, but now perhaps I'll do a graphics package. Computer art for the home — sounds a bit sterile, doesn't it, but it needn't be!

"I'm dying to get my hands on a 16 bit machine too. Just what could then be done is the kind of thing dreams are made of. I'm not going to limit myself to any one machine because that would be dangerous."

Neither has Sandy abandoned his sculpture. He is now building custom designed computer boards to control his most recent work and he is writing a new computer language specifically to play music and choreograph robots.

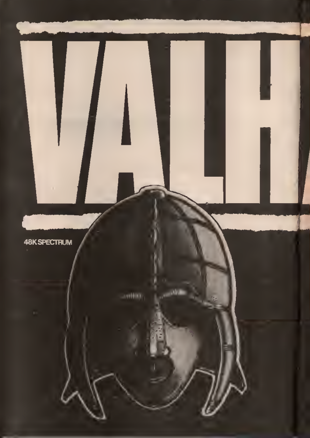
"I'm working on a development system to enable me to combine a music keyboard and joystick console to make it easier to enter data." At an exhibition in Aberdeen last year Sandy showed three sculptures, each of which told its own story in music and movement. "People pressed the button and they would perform for about five minutes."

Sandy seems full of ideas for new projects. On the other hand, he shows no interest in converting his computer work for other machines — taking the 3D ideas across to different computers and processors.

"I like innovating. Doing conversions you don't get your programming highs.

"When I write a bit of code that does something new you can show it to your friends and go 'Hey, look at that!' and it feels good." ■





VALH
48K SPECTRUM

More than words can say

***Mike Grace** looks at* The Word *– a powerful word processing package for the Commodore 64*

About two years ago I was introduced to the word processor as a tool for helping me write more efficiently

At the time I had suspected I would be attracted to the machine, but until I sat down and tried it I had no idea what a revolution it would be to my life Suddenly I could do rewrites of articles, change teaching timetables with minimum effort from one year to the next, thump out reviews in much less time not worry about all those silly spelling mistakes I needed to Tippex out — in short, I found I was writing more in less time and with much more enjoyment

The main problem with word processing is that (like anything worthwhile) you have to work hard at it for quite a long time before you get anywhere Instant results just don't happen — the potential user must stumble and stagger through an initiation period (or as the chap selling you the package will say — a training period), before any apparent benefit will penetrate the murky haze of comprehension

Why do people word process anyway? There isn't space in a review article to explain the benefits and advantages of text manipulation (as it is otherwise known) in depth, except to say that the difference between typing or writing and word processing is a bit like the difference between trying to see the world without glasses when you are short sighted — it's so much easier and you have a much greater understanding if you can see properly — it's the same once you've learned to process words

So let's pass over the reasons at this stage and assume that you already know a bit about it — or if you're just getting interested you can discover more by reading on

In my capacity as a teacher at one of the London hospitals I was introduced to a £13,000 dedicated machine that was just beautiful Once I had started using it I knew I would have to have one at home as well — the possibilities seemed endless But, working with a whole hunk of hardware plus the appropriate software tends to spoil one, and only having a Vic20 I tended to look upon the various packages that appeared with some degree of scorn

The main problem was the screen, or rather lack of it For true word processing you need 80 columns otherwise you can't see the whole page No matter how much people tell you that scrolling across your text is soon mastered, or that you type the words in 40 columns and then just alter the margins at the end once you've worked with 80 then anything less is frustrating

But, the Vic only has 22 columns and after looking at lots of packages with a desperate longing to convert myself into thinking small I gave up

Came the 64 and new hope burned eternal Forty columns was a lot better and perhaps I thought perhaps I'd adjust I looked at a few packages again, saw the potential and was about to buy a very swish-looking piece of software when I chanced upon a small stand at the last Commodore Show Tucked away at the back was a little 64 sitting with a monitor and — wonder of wonders — 80 columns

It was true A company called Impas Designs (UK) (Metro House, Second Way Wembley Middlesex HA9 0TY), is importing an 80 column card from Impex International, US that not only converts your 64 into an 80 column machine (even for your basic program if you want), but also contains an incredibly powerful word processing package called *The Word* (along with a maths facility and database as well) It looked too good to be true, and I ordered it then and there

Now exhibitions are really the last place you should order anything, because you don't get the chance to see a proper demonstration and in the rush and bustle it's easy to be misled So it was with slight concern that I awaited my purchase in case I'd made a mistake and there were snags in this beautiful piece of work

I needn't have worried *The Word* turned out to be better than Impex had told me In fact I can honestly say that my 64 plus *The Word* does everything that I've ever been able to do on the dedicated machine at work Of course I haven't yet aspired to a daisywheel but hopefully prices will continue to fall and that's only a matter of time

The main use of word processing is the ability to *Insert* and *Delete* whether it's letters (to correct spelling) or words sentences or blocks of text

But word processing has other great uses like *Search* and *Replace* For this you might want to change the word "stress" in the essay you've written to "strain" With word processing the computer will go right through your essay and automatically change every "stress" to "strain" for you You can also use the *Search* facility to find the place in your written work so you can alter something quickly, which is very useful

Your letters and your documents begin to look much more professional Your 64 will automatically centre anything (for titles, or posters for the stamp club), will underline anything (with the right printer) and will double space

What makes *The Word* stand out to me is not just its capabilities but the ease of use For a start the manual is quite readable albeit a little daunting to the first-time user A lot of care has been put into creating a manual that's "easy to read" so that even loading and running the program is covered simply

I did find the order of the manual a little patchy, and it seemed that there was no structure in the overall planning but it was still pretty easy to find your way to the appropriate section if you needed reminding how to delete a paragraph The first time user is taken carefully through simple procedures first to give him or her confidence in using a computer

The essence of the program is that the *Control* key is just that a method of controlling what you are doing Thus pressing *Control* plus a will allow you to Save your data, *Control* plus l to load text from disc, *Control* plus f to find a word or phrases, etc Most of the other keys are fairly obvious with *Clr/Home* acting as a homing key to take you back to the beginning of the document and *Run/Stop* acting as a Tab key

If you want to insert or delete, then there are three basic methods

(1) The usual *Inst/Del* key acts in the same way as 64 owners are used to and is really just for letters or the odd word

(2) To insert or delete whole phrases or sentences you need to press *Control* and p (for phrase) then press *Control* and either w for word, s for sentence or just use the cursor to select as many letters and spaces as you wish

Having set the phrase in this way you then type *Control* and m for moving text, or *Control* and k for deleting or *Control* and k for changing a phrase from capitals to lowercase or vice versa

(3) To manipulate whole paragraphs there is another set of facilities This time *Control* plus *r* (for range) allows you to take as many lines of text as you require by pressing the cursor down key As you do so each new line is highlighted and, unlike the software I use at work (all £13.000 of it), if you make a mistake you can alter it without having to go back to the beginning

For most word processing though *The Word* has a system of ' embedded commands something familiar to most wp packages What this means is that you write commands in the text to tell your printer what to do Thus, if you want a line centred you would write *cnl* within the text and when the line was printed it would appear in the centre of the page

Similarly, the instruction *jul* tells the printer to right justify the text (this means have all the lines of text end with a straight margin on the right side of the page) This really is extremely easy to use and I found it took me about 30 minutes to get the hang of most of the commands

Perhaps one of the best aspects of *The Word* is the hidden power, the extra facilities it offers besides the ones available on all other packages I will list them, to give you an idea of the scope available

(1) *Column manipulation*
This allows you to set up columns of figures (with alignment of the decimal point) and then move them around in the same way that paragraphs are moved around Very useful for figures in accounting and for lists of things like slides photos records, etc
You can also sort names in columns into numerical or alphabetical order or add or subtract figures

(2) *Linking files*
Every time you write a file you have approximately 350 lines of text or the equivalent of four to six pages of A4 single spaced If you need more than this each file can easily be linked to the next so the printer will print out the whole in one document (you can even stop in the middle of a word)

(3) *Writing form letters*
All this means is that you can write letters and put spaces in (like the name and address) so that one standard letter can be used, but can be "personalised , as in various advertisements and book offers that we all get through the post

(4) *Printer compatabilities*
The Word has been set up for a large variety of popular printers and also has a program allowing you to adapt it to your own if you don't happen to have one of the printers on the list

(5) *Automatic Word Count and Page Numbering*
This is just amazing for budding authors especially the word count, which seems to be missing from many other packages

(6) *User-defined Special characters*
Because some of the characters are used for special functions in wp (for example the £ sign is used to control the embedded commands I was talking about earlier) the package will allow you to define any Ascii character you like Thus to print a £ sign you need to define it earlier as the Ascii code number (92 in the case of the £) and you can still use all the keyboard characters including the $

At £195 + VAT for the package, it may seem a little expensive at first, but it includes a database, a mailmerge and the 80 column board as well as the word processor The 80 column board is also available on he own for £125 + VAT together with a free word processor starter package Versions are also available for the Vic20

In addition you get back up (which I had to use personally when one of the Roms in my board burned out — I received an instant replacement) plus free updates ■

FIGURE I. An example of embedded commands.

```
cn1← (means centre the next line or lines)
INTRODUCTION←
cn0← (means cancel centre command)
← (means create a blank line)
ai+5← (means indent each Paragraph 5 spaces)
One of  the  fears  of  micro-computer  owners  must  be  the
disappearance of either the hardware or,  more  significantly
I suspect, the software.  The  computer  world  is  notorious
for fortunes that are made and lost in  the  twinkling  of  a
line feed (you only  have  to  watch  the  cover  of  Popular
Computing Weekly to see that) and even  an  investment  of  a
hundred Pounds can be Pretty tiresome if there's  nothing  to
Play with or use in the way of software.  So - I  thought  to
myself the other day - how about  my  slightly  battered  but
lovable Vic ?

When the above is actually Printed out it looks like this


                         INTRODUCTION

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myself the other day - how about  my  slightly  battered  but
lovable Vic ?
```

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Sharps and flats

***Keith and Steven Brain** demonstrate the sound capabilities of the Dragon in the first of a two-part series*

This graphic music editor gives an excellent demonstration of a combination of the sound and graphics capabilities of the Dragon as it allows you to enter a piece of music display it in standard musical notation on the screen and then play it (Figure 1)

When entering music we need to consider a number of different factors A single character on the manuscript tells us more than one thing The shape of the character tells us the note length and the position on the stave the actual note on the scale and octave We also need to be able to include sharps and flats Two modes are provided

In *Edit* mode the position is indicated by a flashing cursor which is placed on the line of the stave which corresponds to the current note on the scale The cursor keys can be used to move this position in any direction Up and down arrows change the note on the scale left and right arrows move from your position in the tune and shifted up and down arrows move you from line to line The length of note required is chosen by pressing keys 1 to 4 The spacebar is used to delete an unwanted note

The tune is stored in strings which are sliced to obtain the relevant information for both sound and graphics Each note is coded by a seven character block eg

```
L1203B    L 402C  or L 802D#
```

The first three characters define the note length (eg L12, L 4 or L 8) Note the space when L is less than 10 The next two characters specify the octave which can be 02 or 03 The sixth character is the note on the scale (A – G) and the last character indicates whether the note is flat (–), natural ( ) or sharp (#)

If "P" is pressed in *Edit* mode then *Play* mode is entered and the tune so far is *Played* and displayed on the screen A method of saving your tune is also provided

Setting up

The first stage of the setting up procedure involves clearing the screen to black on green, clearing 10000 bytes for variables, and setting a number of these X controls the left/right position on a line and Y on the overall up/down position on the screen NO is the vertical position on the stave and LI is the current line of music (1 – 4)>

Four array elements are set up as *PA$(n)* to hold the notes entered on each line Initially these are completely filled by 255 single quote marks *( ) (CHR$(39)* If you try to *Play* a blank space you sometimes get an *Fc error* but the system is quite happy to *Play CHR$(39)* even though you can t hear it Filling the string in this way prevents problems when slicing

```
 10 GOTO 690
690 PMODE 4 1 SCREEN 1 0 PCLS1 COLOR0 1
    CLEAR 10000 X = 40 Y = 48 NO   7 LI   1
    DIM PA$ (4) FOR N = 1 TO 4 PA$ (N) =
    STRING$ (255 39) NEXT N
```

Graphic parts

We draw all the required graphics parts first and then *Get* and *Put* them (Figure 2) The picture for each graphic part must be stored in a separate array by *Get* so a number of arrays are set up

```
700 DIMSB (0 10)  DIMM1 (0 10)  DIMM 2(0 10)
    DIMC1 (0 10)  DIMC2 (0  10)  DIMQ1 (0 10)
    DIMQ2 (0 10)  DIMS1 (0 10)  DIMS2 (0 10)
    DIMSP (0,30)  DIM SA (0 10)  DIM CU (0 10)
    DIM SH (0 10)  DIM FL (0 10)
```

Now the signs for the different note-lengths can be drawn All these have a circle as a basic part so seven are drawn This completes the drawing of the first one, the semibreve

```
710 FOR N = 20 TO 140 STEP 20 CIRCLE (N 20) 3
    NEXT N
```

The other six drawings represent only three actual lengths of note as the position of the tail on these must vary according to their position on the stave First those with an ascending tail

```
720 FOR N = 40 TO 80 STEP 20 LINE (N + 3,20) –
    (N + 3 10) PSET NEXT N
```

and then those with a descending tail

```
730 FOR N = 100 TO 140 STEP 20 LINE (N – 3,20)
    (N – 3 30) PSET NEXT N
```

Now we need some black paint to distinguish the quaver and crotchet from the minim

```
740 PAINT (80 20) 0 0 PAINT (80 20) 0 0 PAINT
    (120,20) 0 0 PAINT (140 20) 0 0
```

and finally we must dash the tail of the quaver

```
750 LINE (83 10)   (88 13) PSET LINE (137,30) –
    (142,27) PSET
```

A replacement section of the stave is drawn

```
760 FOR N – 0 TO 16 STEP 4 LINE (150 N + 15) –
    (170 N + 15) PSET NEXT N
```

followed by a bar line

```
770 LINE (160 20) – (160 30) PSET
```

a sharp sign Continued on page 23

Figure 1 Graphic music editor

Figure 2 Graphic parts

Figure 3 The stave




```
790 DRAW "BM200 24S4R2U2BM + 2 +0
    D2R2BM + 0 +2 L2D2BM - 2, +0 U2L2"
```

and a flat sign

```
790 DRAW "BM250 20D10E3H3"
```

We now *Get* each of these into the appropriate array before passing to the subroutine which draws the stave (this is placed as a subroutine as it is also used by the play routine later)

```
600 GET (17 17) - (23 23) SB G
610 GET (37 10) - (43 23) M1 G
620 GET (57 10) - (63 23) C1 G
630 GET (77 10) - (83 23) Q1 G
640 GET (97 17) - (103 30) M2 G
650 GET (117 17) - (123 30) C2 G
660 GET (137 17) - (143 30) Q2 G
670 GET (150 0) - (170 56) SP G
680 GET (180 20) (188 36) BA, G
690 GET (200 22) (207 28) SH G
700 GET (220 20) (224 30) FL, G
710 GOSUB 920 GOTO 60
```

Drawing the stave

The graphics parts are erased and four sets of five lines are constructed down the screen (Figure 3). The complex treble clef is easily *Drawn* after an appropriate Blank Move to set the position.

```
920 PMODE 4 1 SCREEN 1 0 PCLS 1 CLS 1
    COLOR 0 1
930 FOR N = 40 TO 160 STEP 40
940 FOR M = 0 TO 16 STEP 4
950 LINE (0 N + M) - (250 N + M) PSET
960 NEXT M
970 LINE (0 N) - (255 N + 16) PSET 0
980 DRAW "BM10 " +STR$(N + 22) +
    "RU25E3R3FD4G12DF2R6U3"
990 NEXT N
1000 RETURN
```

On *Return* we jump back to the program proper in line 60

Cursor and keycheck

Inkey$* is read into *A$ and then we *Get* a square of the screen around co-ordinates X Y into CU and immediately *Put* it back with *Preset*. This inverts the screen display in that area

After a short delay CU is *Put* back with *Pset* to recreate the original display. If no key is pressed this flashing cursor sequence is repeated. If a key is pressed a check is made to see if the current position is too far to the left (X < 40) or right (X > 240)

```
60 A$ = INKEY$ GET (X - 5 Y - 5) - (X + 5 Y +
   5) CU G PUT (X - 5, Y - 5) - (X + 5 Y + 5)
   CU PRESET FOR N = 1 TO 50 NEXT N PUT (X
   - 5 Y 5) - (X + 5 Y + 5) CU PSET IF A$ =
   "" THEN 60 ELSE IF X < 40 OR X > 240 THEN
   GOTO 60
```

Note lengths

If the position is valid then the *Value* of the key pressed is taken. Only number keys have a *Value* so this separates the number keys from other keys. Keys 1 to 4 are used to indicate note lengths from semibreve to quaver and only these will branch in the *On Goto* to the lines which draw the characters

```
70 A = VAL (A$) ON A GOTO 210 220 230 240
```

The semibreve is easily dealt with as it looks the same no matter where it appears on the stave. Note that the array is *Put And* rather than *Or* to produce superimposition as the screen display is inverted

```
210 PUT (X - 3 Y - 3) - (X + 3, Y + 3) SB AND
    GOTO 250
```

For the other note lengths the current note position on the scale must be checked to determine if the tail should go up or down. If you have not changed the cursor position then the note position (NO) will still be 7

```
220 IF NO < 7 THEN PUT (X - 3, Y - 10) - (X + 3,
    Y + 3) N1 AND GOTO 250 ELSE PUT (X - 3,
    Y - 3) - (X + 3 Y + 10) M2 AND GOTO 250
230 IF NO < 7 THEN PUT (X - 3 Y - 10) - (X + 3
    Y + 3) C1 AND GOTO 250 ELSE PUT (X - 3
    Y - 3) - (X + 3 Y + 10) C2 AND GOTO 250
240 IF NO < 7 THEN PUT (X - 3 Y - 10) - (X + 3
    Y + 3) Q1 AND GOTO 250 ELSE PUT (X - 3
    Y - 3) - (X + 3 Y + 10) Q2 AND GOTO 250
```

This is an extract from Advanced Sound and Graphics for the Dragon Computer by Keith and Steven Brain published by Sunshine Books

On the terraces

***Mike Batty** explains how to construct computer streetscapes in the lest of the senes*

Repeating calculations over ahd over again might seem dull, but if the calculation is repeated in a sufficiently interesting way, computers can produce quhe remarkable sequences of patterns

In an earlier set of articles (*Popular Computing Weekly*, Vol 2 Nce 38-40) we showed how a routine to draw an ellipse could form the building block for producing flower pictures In the last two weeks we have shown how to construct a more literal building block — a wire frame then solid house and here we will show what happens if we repeat these designs to build up pattema of houses

Repetition is not only the way structure is built up in nature but also in man-made objects Houses are arranged into streets, streets into towns Using last week s program, we can build up complex sets of houses — streetscapes without ever having to consider the complex as a whole

The essence of the technique is to plot the hduses in lines, starting with the furthest house from the viewpoint which is placed at the back of the screen and then plotting to the front We will use a standard house which is roughly a cube with sides of 300 units and build up connected lines of houses — terraces We will also introduce some randomness to give a feeling of topography

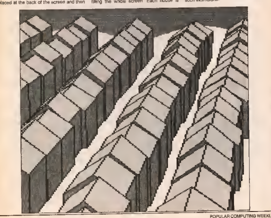
The idea of plotting from the back of the object to its front was introduced last week in the depthsort algorithm When we use the technique for the whole complex it is referred to as *temporal priority* in that nearer objects are plotted later in computer time and have visuel priority over earlier and further objects The program can be extended to plot several lines of streets, but as the temporal priority only refers to each street the streets have to be wide enough not to overlap from the viewpoints chosen

The program has the same general structure as that last week but the roofs of the houses are coloured red and the streets are laid on a blue background which on its horizon gives the Impression of low hills Each street is plotted from the horizon to the edge of the screen thus filling the whole screen Each house is generated by the program in *Procplace* which ensures that a connected terrace results *Procback* plots the blue backgrouhd

To get a view of these streets set the viewpoint distance as 1000, screen distance as 5000 horizontal angle at 100° and vertical angle at 80° (as if looking over the roofops) A typical scene is shown here, but plotted using *Mode5* not *Mode1* due to the space needed to load the screen dump In fact changing the level of resolution in this way does not make too much difference Quite dramatic imagery can result and the 3D effects almost produce a kind of computer sculpture Press any key after the picture is generated to begin a new one

If you explore the program from different viewpoints you will get powerful perhaps disturbing scenes If you live in an industrial city, the program generates *Coronation Street* I find the scenes reminiscent of the Welsh valleys — lines of terraces on bleak hills such as in the Rhondda or New Tredegar

Temppral priority will break down as you approach a flat or side view of the terraces but there is plenty of scope for improvement here Introduce new colours, new objects perhaps the occasional church The program is generel enough to make such extensions. ■



```
10 REM Welsh Valleyscape
20 REM (c)Michael Batty,October,1983
30 MODE1
40 DIM W(10,3),S(10,2),P%(7,5),NP%(7)
50 DIM V(7),VV(7),NV%(7),C%(7),COL%(7)
60 VDU19,0,4;0;19,2,0;0;
70 N%=10:M%=7:NS%=5:COLOUR 2
80 ZBASE=-200:START=-200
90 FOR I%=1 TO M%
100   READ NP%(I%):NEXT I%
110 FOR I%=1 TO M%
120   FOR J%=1 TO NP%(I%)
130     READ P%(I%,J%)
140     NEXT J%:NEXT I%
150 FOR I%=1 TO M%
160   READ C%(I%):NEXT I%
170 FOR I%=1 TO M%
180   READ COL%(I%):NEXT I%
190 GCOL0,128:CLG:NS%=5:VDU23,1,1;0;0;0;
200 INPUT TAB(1,1)"DISTANCE FROM VIEW ",RHO
210 INPUT TAB(1,2)"DISTANCE FROM SCREEN",DIS
220 INPUT TAB(1,3)"HORIZONTAL ANGLE ",TH
230 INPUT TAB(1,4)"VERTICAL ANGLE ",PH
240 GCOL0,130:CLG:VDU23,1,0;0;0;0;
250 I1%=INT(RHO/DIS):NS%=NS%+I1%
260 X0%=1200:INC%=500:VDU29,0;0;
270 TH=RAD(TH):PH=RAD(PH):PROCSETUP
280 PROCBACK
290 VDU29,640,MAX%;
300 FOR JI%=1 TO NS%
310   W(4,2)=START
320   REPEAT
330     PROCPLACE
340     FOR I%=1 TO N%
350       PROCTRANS(I%)
360       NEXT I%
370     PROCSOLID
380     UNTIL S(5,1)<-900 OR S(4,1)>900
        OR S(8,2)<-1100
390   X0%=X0%-INC%-RND(200):NEXT JI%
400 A=GET:GOTO 190
410 END
420 DEFPROCSETUP
430 S1=SIN(TH):C1=COS(TH)
440 S2=SIN(PH):C2=COS(PH)
450 XR=RHO*S2*C1:YR=RHO*S2*S1:ZR=RHO*C2
460 ENDPROC
470 DEFPROCBACK
480 GCOL0,0:YS%=900
490 DT=RAD(10):A=RAD(RND(360))
500 S=SIN(DT):C=COS(DT):SS=SIN(A):CC=COS(A)
510 SI=25+RND(25):YN%=YS%+SI*SS
520 MOVE 0,0:MOVE 0,YN%:MAX%=100000
530 FOR I%=20 TO 1200 STEP 20
540   SN=SS*C+CC*S:CC=CC*C-SS*S:SS=SN
550   YN%=YS%+SI*SS
560   IF YN%<MAX% THEN MAX%=YN%
570   PLOT85,I%,0:PLOT85,I%,YN%
580   NEXT I%
590 ENDPROC
600 DEFPROCPLACE
610 X1%=X0%-150-RND(50):X2%=X0%+150+RND(50)
620 X3%=(X1%+X2%)/2:Y1%=W(4,2)
630 Y2%=Y1%+750+RND(50):Z1%=ZBASE
640 Z2%=Z1%+250+RND(50):Z3%=Z2%+100+RND(25)
650 K1%=0:K2%=4:K3%=2
660 REPEAT
670   K1%=K1%+1:K2%=K2%+1:K3%=K3%+1
680   W(K1%,1)=X1%:W(K2%,1)=X2%:W(K3%,2)=Y2%
690   UNTIL K1%=4
700 K1%=8:K2%=0:K3%=6:K4%=1:K5%=7:K6%=5
710 REPEAT
720   K1%=K1%+1:K2%=K2%+1:K3%=K3%+1
730   K4%=K4%+1:K5%=K5%+1:K6%=K6%+1
740   W(K1%,1)=X3%:W(K2%,2)=Y1%:W(K3%,2)=Y1%
750   W(K4%,3)=Z1%:W(K5%,3)=Z1%
770 [illegible]=2
780 W(9,[illegible]):W(10,2)=[illegible]1%:W(0,[illegible]
790 ENDPROC
800 DEF[illegible](I%)
810 X=W([illegible]):Y=W(I%,2):Z[illegible]
820 X1=-X*[illegible]Y*C1
830 Y1=-X*C1*C2-Y*S1*C2+Z*[illegible]
840 Z1=-X*S2*C1-Y*S2*S1-Z*C[illegible]
850 D=DIS/Z1:S(I%,1)=D*X1:S([illegible])=D*Y1
860 ENDPROC
870 DEFPROCSOLID
880 PROCDEPTH:PROCSORT
890 FOR I%=1 TO M%
900   IF C%(NV%(I%))=1 THEN PROCFILL1(NV%(I%))
910   IF C%(NV%(I%))=0 THEN PROCFILL2(NV%(I%))
920   NEXT I%
930 ENDPROC
940 DEFPROCDEPTH
950 FOR I%=1 TO M%
960   V(I%)=-EXP(50):VV(I%)=EXP(50)
970   NV%(I%)=I%
980   FOR J%=1 TO NP%(I%)
990     K%=P%(I%,J%)
1000    D1=(W(K%,1)-XR)^2:D2=(W(K%,2)-YR)^2
1010    D3=(W(K%,3)-ZR)^2:D=SQR(D1+D2+D3)
1020    IF D>V(I%) THEN V(I%)=D
1030    IF D<VV(I%) THEN VV(I%)=D
1040    NEXT J%:NEXT I%
1050 FOR I%=1 TO M%
1060   V(I%)=(V(I%)+VV(I%))/2
1070   NEXT I%
1080 ENDPROC
1090 DEFPROCSORT
1100 FOR I%=2 TO M%
1110   FOR J%=I% TO 2 STEP -1
1120     IF V(J%)<=V(J%-1) THEN GOTO 1170
1130     T=V(J%):F%=NV%(J%)
1140     V(J%)=V(J%-1):NV%(J%)=NV%(J%-1)
1150     V(J%-1)=T:NV%(J%-1)=F%
1160     NEXT J%
1170   NEXT I%
1180 ENDPROC
1190 DEFPROCFILL1(I%)
1200 GCOL0,COL%(I%)
1210 PROCMMOVE(I%,1):PROCMMOVE(I%,2)
1220 PROCMPLOT(I%,3):PROCMMOVE(I%,1)
1230 PROCMPLOT(I%,4):PROCLINE(I%)
1240 ENDPROC
1250 DEFPROCFILL2(I%)
1260 GCOL0,COL%(I%)
1270 PROCMMOVE(I%,1):PROCMMOVE(I%,2)
1280 PROCMPLOT(I%,3):PROCMMOVE(I%,1)
1290 PROCMPLOT(I%,4):PROCMPLOT(I%,5)
1300 PROCLINE(I%)
1310 ENDPROC
1320 DEFPROCMMOVE(I%,J%)
1330 K%=P%(I%,J%):MOVE S(K%,1),S(K%,2)
1340 ENDPROC
1350 DEFPROCMPLOT(I%,J%)
1360 K%=P%(I%,J%):PLOT85,S(K%,1),S(K%,2)
1370 ENDPROC
1380 DEFPROCLINE(I%)
1390 GCOL0,3:PROCMMOVE(I%,1)
1400 FOR J%=2 TO NP%(I%)
1410   K%=P%(I%,J%):DRAW S(K%,1),S(K%,2)
1420   NEXT J%:K%=P%(I%,1)
1430 DRAW S(K%,1),S(K%,2)
1440 ENDPROC
1450 DATA 4,4,4,5,5,4,4
1460 DATA 1,2,3,4,1,8,5,4,5,6,7,8
1470 DATA 4,3,9,6,5,1,2,10,7,8
1480 DATA 2,10,9,3,7,10,9,6
1490 DATA 1,1,1,0,0,1,1
1500 DATA 2,2,2,2,2,1,1
```

File under filed

***Sam Knowles** presents a filing program that can be used on cassette or Microdrive*

Multi-file is a cassette (or Microdrive) based filing system designed to operate on the 48K Spectrum microcomputer, although it might be possible to reduce it to run on the 16K model, using fewer entries.

The program is very versatile and can hence be used by a large number of micro owners, eg (1) A small company of up to and including 200 employees. In an example such as this, information such as surnames, ages, previous experience, NI numbers, wages, salary levels, etc, could be entered. The surnames should be placed as the first item since the computer will sort out the array *a$ (Categories, 200,10)* with *a$* (1,n,12) as the most significant. (2) A record cassette or video-cassette library, particularly if you own a disc or Microdrive system.

Notes

20-60	Improvement of certain system variables
70-80	Brief on screen explanation of the program
90	Entry of the number of categories
100 119	Check validity of the entry
120-130	Set up the main arrays.
140-200	Set up the Menu of options
210-240	If a key has been pressed, validity will be checked and the appropriate routine gone down to
1000-1420	ENTRY & SORT THE FILE
1000-1060	Enter the headings and obtain the full colour and printing arrays
1070 1120	Enter information on the WORDSth entry and display them
1130 1180	Carry on, quit or copy?
1300 1420	Sort out the file taking the first piece of and as the most significant.
2000-2090	PRINTER DUMP
2001 2003	Mug trap
2020	Printer on
2030 2090	Print out the items on to the printer
3000-3140	SCREEN DUMP
4000-4120	SAVE & VERIFY THE FILE
5000 5120	LOAD THE FILE OR PROGRAM
6000-6050	ADD TO THE FILE
7000-7340	SEARCH THE FILE FOR SPECIFIC ITEM UNDER SPECIFIC HEADING
7001 7003	Mug trap
7060-7100	Options for search — make choice and check validity
7170-7177	Enter item to be searched for and adjust its length if it is too long or short
7180-7340	Search the file to print matches out and display them
9000-9510	Fill the 4 printing and colour arrays.

If it is likely that many items will be matched up during the searching process (more than 30), further dimension array *R(x)* to whatever size seems suitable but look out for an out of memory error message.

Microdrive option

Erase 11 4000-4120 replacing it with
4000 ERASE "m" 1 "MULTI-FILE" DATA a$()
4010 SAVE* "m" 1 "MULTI FILE" DATA a$()
4020 GO TO 140

Using the ZX Net, this file could of course be transmitted. User 2 would prepare his station in the following method:

FORMAT "n",2 — set the network station to no 2
FORMAT "I",19200 — set the baud (data transmission) rate to 19200 bits per second
LOAD* "n",1 — load program from user 1 to the current network station (2, himself)
The first user would now transmit the program by SAVE* "n",2

Variables

F Z C A G & W — FOR — NEXT loops
WORDS — no entries so far
CATEGORIES — number of pieces of info of the max possible 200 filled so far
SORTWORD — WORDS+1 for printing on printer
SORT — SORTWORD only used in the screen dump
TOT — no item matched
R$ — 12 spaces, used for annulling entries.
Z$ — first letters of the various Menu-operates options.
Y$ — universal DATA READing string
X$ & J$ — INKEY$ READing string
E$ — item to be searched for the rummaging routine

Arrays

P(2,5) — system variable improvement array used for the Pokes
P(1,1 to 5) — locations
P(2,1 to 5) — addresses
A$ (CATEGORIES,200,12) — array with CATEGORIES categories, each containing up to 200 entries up to 10 characters in length
H$ (CATEGORIES,12) — headings of the categories
C$(CATEGORIES,12) — used in sorting — corresponds to A$(
Z(7) — CODE value used to GO TOs also the main Menu
R(30) — rummage array to store matched items and their codes
P(10) C(10) — PRINT positions of the max 10 different categories
S(10) T(10) — the colours provided for these PRINT positions ■

```
  10 REM Multi-file © TDR 1983
       by Sam Knowles
  20 DATA 23693,23658,23608,2356
2,23561
  30 DATA 48,0,30,1,10
  40 DIM P(2,5)
  50 FOR F=1 TO 2: FOR G=1 TO 5:
 READ P(F,G): NEXT G: NEXT F
  60 FOR F=1 TO 5: POKE P(1,F),P
(2,F): NEXT F
  70 LET WORDS=0: LET R$="
     ": CLS : BORDER 6: PRINT T
AB 10; BRIGHT 1; FLASH 1;"MULTI-
FILE"; BRIGHT 0'' PRINT "TAB 2;"©
 Tyger Data Research 1983"
       by Sam Knowles'''
  80 PRINT "This multi-file syst
em allows    you to enter up to 1
0 pieces of information on 200 i
tems, each   of which is permitte
d to be up   to 12 characters in
length."
  90 INPUT "How many categories
do you wish to have in the filin
g system ?" [redacted]   (limit i
1 to 10)";CATEGORIES
 100 IF CATEGORIES<1 OR CATEGORI
ES>10 THEN PRINT #0; BRIGHT 1;"I
NVALID ENTRY   PRESS ANY KEY": P
AUSE 0: GO TO 90
 110 LET CATEGORIES=INT (CATEGOR
IES)
 120 DIM A$(CATEGORIES,200,12)
 125 DIM H$(CATEGORIES,12)
 130 CLS
 140 CLS : RESTORE 150
 150 DATA "OPEN A FILE","DUMP FI
LE ON PRINTER","PRINT OUT FILE",
"SAVE THE FILE","LOAD A FILE","A
DD TO THE FILE","RUMMAGE THE FIL
E"
 160 LET Z$="ODPSLAR": DIM Z(7):
 FOR F=1 TO 7: LET Z(F)=CODE Z$(
F): NEXT F
 170 PRINT TAB 11; [redacted] ''
 180 FOR F=2 TO 8: READ Y$: PRIN
T AT (F+2),4; FLASH 1; INVERSE 1
;Y$( TO 1); FLASH 0; INVERSE 0;Y
$(2 TO ): NEXT F
 190 PRINT #1; BRIGHT 1;"MAKE CH
OICE BY PRESSING"; BRIGHT 0;"
   ",#1; BRIGHT 1;"CORRECT KE
Y (FLASHING LETTER)"
 200 PAUSE 0
 210 LET X$=INKEY$: IF X$="" THE
N GO TO 210
 220 LET X=CODE X$: FOR F=1 TO 7
: IF X=Z(F) THEN GO TO (1000*F)
 230 NEXT F
 240 PRINT AT 18,0;"TRY AGAIN":
PAUSE 100: PRINT AT 18,0;"
    ": GO TO 210
1000 REM OPEN A FILE
1010 GO SUB 9000
1020 CLS : PRINT TAB 7;"CATEGORI
ES ";CATEGORIES
1030 FOR F=0 TO (CATEGORIES-1)
1040 INPUT ("HEADING ";(F+1))''
LINE H$((F+1))
1050 PRINT AT ((F*2)+2),((2-(LEN
 STR$ (F+1)))),(F+1),"J ",H$((F+
1))
1060 NEXT F
1070 CLS : LET WORDS=WORDS+1: IF
 WORDS>=301 THEN GO TO 1500
1080 PRINT AT 21,22; [redacted] ;WOR
DS
1090 FOR Z=1 TO CATEGORIES
1100 INPUT ( BRIGHT 1;H$(Z); BRI
GHT 0;WORDS)'' LINE A$(Z,WORDS)
1110 PRINT AT P(Z)-2,C(Z); INK S
(Z); PAPER T(Z);H$(Z)
1115 PRINT AT P(Z),C(Z); BRIGHT
1;A$(Z,WORDS)
1120 NEXT Z
1130 PRINT #0; FLASH 1; INK 7; P
APER 3;" C COPY,Q QUIT,ELSE CONT
INUE"
1140 LET J$=INKEY$: IF J$="" THE
N GO TO 1140
1150 IF J$="C" THEN COPY : GO TO
 1070
1160 IF J$="Q" THEN GO TO 1300
1170 IF J$="E" THEN GO TO 1070
1180 GO TO 1070
1300 REM SORT OUT THE FILE
1310 CLS : PRINT TAB 3; BRIGHT 1
;"SORT NOW TO TAKE PLACE"; BRIGH
T 0'' The computer will now sor
t out  the series of entries int
o       alphabetical order, takin
g the   first piece of informatio
```

```
n      entered in each case as t
he most significant."
1320 PRINT AT 20,0; FLASH 1;"PRE
SS ANY KEY TO COMMENCE SORT": PA
USE 0: PRINT AT 20,0;,
1330 PRINT AT 11,6; INK 3; PAPER
 7; FLASH 1;"SORT IN "; INVERSE
1;"PROGRESS"
1340 DIM C$(CATEGORIES,12)
1350 FOR F=1 TO WORDS: FOR G=1 T
O (WORDS+2)
1360 FOR C=1 TO CATEGORIES: LET
C$(C)=A$(C,G): NEXT C
1370 IF A$(1,G+1)>=A$(1,G) THEN
GO TO 1390
1380 GO TO 1410
1390 FOR X=1 TO CATEGORIES: LET
A$(X,G)=A$(X,G+1): NEXT X
1400 FOR X=1 TO CATEGORIES: LET
A$(X,G+1)=C$(X): NEXT X
1410 NEXT G: NEXT F
1420 GO TO 140
2000 REM DUMP FILE ON PRINTER
2001 CLS : IF A$(1,1)=k$ THEN PR
INT #0; BRIGHT 1;"NO DATA HELD I
N COMPUTER": PAUSE 100: GO TO 14
0
2010 PRINT TAB 8; BRIGHT 1;"PRIN
TER DUMP"; BRIGHT 0''"The file
is now being dumped    onto the
printer in full, & in  the alpha
betical order into     which the
 computer has sorted it"
2020 OPEN #2,"P"
2030 PRINT "Multi-file © TDA 198
3"''
2040 LET SORTWORD=WORDS+1
2050 LET SORTWORD=SORTWORD-1: IF
 SORTWORD=0 THEN CLOSE #2: GO TO
 140
2055 PRINT '' [illegible] ,(WORDS-SORT
WORD)+1
2060 FOR F=1 TO CATEGORIES
2070 PRINT H$(F),"    ",A$(F,SORT
WORD)
2080 NEXT F
2090 GO TO 2050
3000 REM DISPLAY FILE ON SCREEN
3010 CLS
3020 PRINT TAB 6; BRIGHT 1;"SCRE
EN DUMP"; BRIGHT 0''"The file w
ill now be dumped ontothe screen
 in full, & in the    alphabetic
al order into which    the comput
er has sorted it."
3030 PRINT AT 20,0; FLASH 1; INK
 7; PAPER 3;"PRESS ANY KEY FOR S
CREEN DUMP": PAUSE 0
3040 CLS
3050 LET SORT=WORDS+1
3060 LET SORT=SORT-1
3070 IF SORT=0 THEN PAUSE 0: GO
TO 140
3075 CLS : PRINT    [illegible] ,(WORD
S+1-SORT)
3080 FOR F=1 TO CATEGORIES
3090 PRINT INK S(F); PAPER T(F);
H$(F)
3100 PRINT "      ",A$(F,SORT)'
3110 NEXT F
3120 PRINT #0;"PRESS A KEY"
3130 PAUSE 0
3140 GO TO 3060
4000 REM SAVE THE FILE
4010 CLS : INPUT "Name of file ?
"; LINE S$: IF S$="" THEN LET S
$="FILE "+STR$ WORDS
4020 IF LEN S$>10 THEN LET S$=S$
( TO 10)
4030 PRINT ''"SAVE  "; INVERSE 1;
S$; INVERSE 0: PRINT ''"O.K. ?":
 PAUSE 0: IF INKEY$="Y" THEN PR
INT CHR$ 8;"  ": GO TO 4050
4040 GO TO 4010
4050 PRINT ''"SAVEing  "; BRIGHT
1;S$
4060 SAVE S$ LINE 140
4070 CLS
4080 PRINT "Now to VERIFY the fi
le"
4090 PAUSE 100: PRINT "Press any
 key to VERIFY"
4100 PRINT "   VERIFYing ", BRIG
HT 1;S$
4110 VERIFY S$
4120 GO TO 140
5000 REM LOAD A NEW FILE
5010 CLS : PRINT TAB 6; BRIGHT 1
;"LOAD FILES FROM TAPE": PRINT
 "Press "F" to LOAD a program
 Press "D" for a file of DATA
5020 PAUSE 0
5030 IF INKEY$<>"F" AND INKEY$<>
"D" THEN GO TO 5020
5040 IF INKEY$="D" THEN GO TO 51
00
5050 CLS : PRINT "LOADing    -
 O.K. ?": PAUSE 0: IF INKEY$="Y"
 THEN PRINT CHR$ 8;"  ": LOAD ""
5060 GO TO 5010
5070 GO TO 140
5100 CLS : PRINT "LOADing   " D
ATA A$() - O.K. ?": PAUSE 0: IF
 INKEY$="Y" THEN PRINT CHR$ 8;"
   LOAD    DATA A$()
5110 GO TO 5010
5120 GO TO 140
6000 REM ADD TO THE CURRENT FILE
6010 CLS : PRINT "Now to add to
the existing file which is store
d by the computer"
[illegible] ,WORDS, [illegible] ea
ch with  ,CATEGORIES," category
6020 IF CATEGORIES>1 THEN PRINT
CHR$ 8,CHR$ 8;"ies"
6030 PRINT AT 20,0; INK 7; PAPER
 3;"PRESS ANY KEY TO ADD TO THE
FILE": PAUSE 0
6040 GO TO 1070
6050 GO TO 140
7000 REM RUMMAGE THROUGH FILE
7010 CLS : PRINT TAB 5; BRIGHT 1
;"RUMMAGE THE FILE"; BRIGHT 0
'"Now is your chance to rummage
 through file which you have set
 up."
7020 PRINT AT 20,0; FLASH 1; INK
 7; PAPER 3;"PRESS ANY KEY TO RU
MMAGE"
7030 PAUSE 0
7040 CLS
7050 PRINT "There are ",CATEGORI
ES;" categories"
7060 FOR F=1 TO CATEGORIES
7070 PRINT AT (F*2+1),(12-LEN ST
R$ F);"(";F;") ";H$(F)
7080 NEXT F
7090 PRINT #0; FLASH 1; INK 7; P
APER 3;"PRESS YOUR CHOICE (0 =)
10)": PAUSE 0
7100 LET J$=INKEY$: IF J$<"0" OR
 J$>"9" THEN GO TO 7100
7120 LET J=(CODE J$)-48
7130 IF J=0 THEN LET J=10
7140 IF J>CATEGORIES THEN GO TO
7100
7150 PRINT AT 5+(2*(J)-1)-3,((2-
LEN STR$ J)); OVER 1; FLASH 1;
7151 PRINT AT 5+(2*(J)-1)-3,10;
FLASH 1;"CHOSEN
7160 IF J=10 THEN PRINT FLASH 1;
 OVER 1;
7161 FOR F=1 TO 2: RANDOMIZE USR
 3582: NEXT F
7170 INPUT "Enter item to be sea
rched "'' LINE E$
7175 IF LEN E$<12 THEN FOR F=1 T
O (12-LEN E$): LET E$=E$+" ": NE
XT F
7180 DIM A(30): LET TOT=1
7190 FOR F=1 TO WORDS
7200 IF E$=A$(J,F) THEN LET A(TO
T)=F: LET TOT=TOT+1
7210 NEXT F
7220 IF A(1)=0 THEN PRINT #0; FL
ASH 1; INK 7; PAPER 3;"NO ITEMS
MATCHED   PRESS A KEY": PAUSE 0:
 GO TO 140
7232 CLS
7235 PRINT TOT-1;" items ";
7236 IF (TOT-1)<2 THEN PRINT CHR
$ 8;" has ";
7240 PRINT " been found to""""ma
tch with ",E$
7260 PRINT AT 20,0; INK 7; PAPER
 3;"PRESS ANY KEY TO SEE THE MAT
CHES": PAUSE 0
7260 FOR A=1 TO TOT-1
7270 CLS : PRINT  [illegible] ,A(A)''
7280 FOR F=1 TO CATEGORIES
7290 PRINT INK S(F); PAPER T(F);
H$(F),
7295 PRINT "    ",A$(F,A(A))
7300 NEXT F
7310 IF (TOT>F) THEN PRINT #0;"P
RESS ANY KEY FOR NEXT MATCH"
7320 PAUSE 0: NEXT A
7330 PRINT #0; FLASH 1; INK 7; P
APER 3;"END OF MATCHING   PRESS
ANY KEY"
7340 PAUSE 0: GO TO 140
8999 STOP
9000 DIM P(10): DIM C(10): DIM S
(10): DIM T(10)
9010 RESTORE 9500
9020 FOR F=1 TO 10
9030 READ P(F),C(F)
9035 READ S(F),T(F)
9040 NEXT F: NEXT G
9050 RETURN
9500 DATA 2,2,3,7,6,2,1,5,10,2,7
,2,14,2,6,1,16,2,0,5
9510 DATA 2,17,0,5,6,17,0,1,10,1
7,7,2,14,17,1,5,10,17,7,3
9800 FOR F=1 TO 10: PRINT C(1,F)
,C(0,F): NEXT F
```



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Secret addresses

***Keith and Steven Brain** reveal some of the secrets hidden inside the Aquarius*

The Aquarius is a relatively new contender at the lower end of the home computer market and no information is available on the location of the systems variables. However, we have been *Peeking* around the memory of the Aquarius and with a little detective work have unearthed the addresses of a number of the system locations which you can easily *Peek* and *Poke* to improve your programs.

The keyboard scan uses locations *14346* to *14351*. The accompanying routine allows you to take a *Peek* into these locations, so that you can see what happens when you press keys.

```
10 PRINT CHR$(11)
20 PRINT "address"TAB(9)"CHR$"TAB(15)"code"
30 PRINT
40 SL=14346
50 FOR IN=0 TO 5:PRINT SL+IN:NEXT
60 FOR SP=130 to 300 STEP 40
70 POKE 12328+SP,PEEK(SL+X)
80 N$=RIGHT$("   "+STR$(PEEK(SL+X)),3)
90 FOR L=1 TO LEN(N$)
100 POKE 12328+SP+L+5,ASC(MID$(N$,L,1))
:NEXT L
110 X=X+1:NEXT SP:X=0
120 GOTO 60
```

Three columns are produced on the screen labelled "address", "*Chr$*" and "code" and these are continuously updated. If you press a key, you will immediately notice that three of these locations change their values. A little experimentation reveals that location *14346* always contains the Ascii code of the last key pressed. Location *14350* contains 0, as long as no key is pressed, and when a key is pressed location *14351* contains *6*. When you press *Ctl* and a 'keyword', then locations *14347* and *14348* also change.

Checks on combinations of these can easily be used to produce auto repeat on any of the keys. If you add these lines and *Run 200* you will find that, if you hold down a key, it will continue to repeat until you let go.

```
200 IF PEEK(14351)<>6 THEN 200
210 PRINT CHR$(PEEK(14346));
220 GOTO 200
```

When you first start, you will find that you get a few pound signs, as there is a short delay before the value in *14351* goes to *6*. You can easily get rid of these by adding a short delay before the check. This auto repeat works for both upper and lower-case characters. The backspace will also act to delete characters, and *Rtn* gives a carriage return (move back to the first column) without a line feed (move down a line).

When you press *Ctl* and a 'keyword', then the whole keyword is printed with the last letter repeated, and some of the keys which are not used for keywords give certain of the graphics characters. For most immediate response to a key press it is best to check that *Peek(14351)<>6*, rather than *Peek(14350)=0* as the system cycles a series of 20-odd values through these locations when a key is pressed.

Although you can use *Print Tab(X)* to move the print position further on, you cannot move the print position back up the screen in Aquarius Basic. This is a nuisance if you want to refresh values on the screen. The normal solution is the one used in our first example, where the simple variable was converted to a string, sliced, and then the Ascii code of each slice *Poked* into place (notice that some spaces were also added to the front of the string and then *Right$* taken to give a *Print Using* type of formatting effect so that the columns of figures lined up correctly).

Unfortunately, all this *Poking* is rather slow and it would be much better if we could reset the cursor position. The key locations here are *14337* and *14338*, so change the start address in the previous routine, so that you can inspect these locations.

```
40 SL=14337
```

If you Run this, you will see that *14337* contains *145* and *14338* contains *49*. Now *(49*256)+145=12689*, which is the screen start address *(12328)* plus 10 times 40 (the number of positions already used to print the display) plus one. Now add this line which prints one character at a time and watch how the values increment.

```
115 PRINT "a";
```

You will see that location *14337* increments by one each time a character is printed, until it passes *255* when it resets to *0* and *14338* increments by one. Replace the simple *Print* in line 30 by

```
30 PRINT PEEK(14337),PEEK(14338)
```

which show the values immediately after clearing the screen and you will see that these are *81* and *48 ((48*256)+81=12369 ie screen start + 1)*. You can therefore see that these locations point to the next print position.

Now, to construct a *Print At* function all we need do is add our screen offset *(Of)* to the initial value *(Ch)* and then *Poke* in the appropriate figures. As one byte can only hold numbers up to *255*, we must convert our value into two bytes and *Poke* them separately. Define the first screen position as a variable *(Ch)* and add on the offset first:

```
300 PRINT CHR$(11)
310 CH=12328
320 PRINT "OFFSET";:INPUT OF
330 PS=CH+OF
340 POKE 14337,ps-256*INT(PS/256)
350 POKE 14338,INT(PS/256)
360 PRINT "HERE"
365 GOTO 310
```

Run 300 and *Input* offset values from *0* to *920* when you will see that the "*Here*" message can now be placed anywhere on the screen. The only drawback with this technique appears when you *Stop* the program with *Ctl-C* and *List* — you will find that very strange things happen to your listing which now probably starts half way across the screen and wraps round at the edges! Fear not, the solution is simple. If you press *Rst* and then *Ctl-C*, the system will automatically reset to the normal state, or alternatively you can *Poke* the system back to a sensible screen position (like *12328*) when you finish if you need to.

```
370 POKE 14337,81
380 POKE 14338,48
```

If you used an offset greater than *946*, then even stranger things happen when you stop the program, as the screen border changes colour! Now that could be a useful additional feature to include in your programs, so let's look a little further.

Presumably, we must have altered a system address after the end of the character screen, so try *Poking* each location after *12328+959*. Lo and behold, when you *Poke 13312*, the border colour changes to the colour corresponding to the number you *Poked* in.

```
400 INPUT N
420 POKE 13312,N
460 GOTO 400
```

Now wait a minute — all the colour Ram addresses have corresponding character Ram addresses which are *1024* bytes lower, so what happens if we also *Poke 13312-1024 (12288)*?

```
430 POKE 12288,N
```

Not only can we change the border colour, but we can also fill it with coloured characters!

Notice that all the numbers from *0* to *255* can be used to set both foreground and background colours. If you look closely, you will note that there now appears to be an odd little block sitting at the top left of the screen which is the same as the border. In fact, this is not on the normal screen at all — try *Poke 12328,0* if you don't believe us — but is one line above it. To tidy the screen back up, we need to fill all 40 locations from *13312* with the same value.

```
410 FOR N=0 TO 39
420 POKE 13312+N,N
430 POKE 12288+N,N
460 NEXT N
```

Another thought is to *Poke* a message into the locations following *12288* and see what happens. The easy way to do that is to simply *Input* a negative value (up to 39) in the *Print At* routine. The most important point here is that when the screen scrolls

Continued over the page

this area remains protected (unless you use *Chr$(11)*), so it is an obvious place to put a title or score. For example, *Input* values of *–30* and then *900* then keep pressing *Rtn* and watch the screen scroll without affecting your message

```
320 PRINT"OFFSET":INPUT OF
360 PRINT"TITLE OR SCORE"

990 GOTO 510
```

Facilities are provided to use machine code routines, but they are not really explained in the manual. You have to tell the Aquarius where in memory you have put your machine code by *Poking* the start address of your routine into locations *14340* and *14341*. Now if we want to put the routine at address *16000*, we must *Poke 14340* with *128* and *14341* with *62*

```
1010 PRINT CHR$(11)
1020 POKE 14340,128
1030 POKE 14341,62
```

The simplest way to set up your machine code routine is to enter the numbers into a *Data* statement, *Read* this *Data*, and *Poke* the values into consecutive memory locations.

Here is an example of a short routine which will *Fill* a number of consecutive locations with the same number.

```
1040 DATA 33,48,48,229,209,19,1,192,3,54
,0,237,176,201
1050 FOR N=1 TO 14
1060 READ A
1070 POKE 15999+N,A
1080 NEXT N
```

Machine code routines are called by the Basic *Usr* function and the simplest way to use this command in your programs is to make a dummy (Unused) variable equal to *Usr* times that dummy variable

```
1090 Z=USR(Z)
```

If you enter the previous line and then Run, you will find that after a short delay the whole screen will suddenly fill with pound signs! Even more impressive is the fact that if you now type

```
Z=USR(Z)
```

as a direct command, the screen fills with no perceptible delay at all. The reason that it was slower the first time was that the Basic program had to load the machine code from *Data* into memory before it could execute it, whereas the second command used the routine you had already loaded into position.

Of course, you can fill the screen with a single character with Basic, but only very slowly. For example, *Poking* a number into each of the *960* positions in the character Ram takes a whole eight seconds. On the other hand, this simple 14 byte routine does the same job instantaneously.

One of the most important numbers in the code loaded was the one put into location *16010*, as this was the value loaded onto the screen. You can change this by simply *Poking* that location through Basic. Try this loop, which manages to sequentially fill the screen completely with each one of the *256* characters in about four seconds, to really appreciate the speed of machine code

```
1120 FOR N=0 TO 255
1130 POKE 16010,N
1150 Z=USR(Z)
1160 NEXT N
```

THE 'FILL' ROUTINE

address	code*	
0	33	LD HL,nn
1	48	low byte of start address
2	48	high byte of start address
3	229	PUSH HL
4	209	POP DE
5	19	INC DE
6	1	LD BC,nn
7	192	low byte of length
8	3	high byte of length
9	54	LD (HL),n
10	0	fill code
11	237	LDIR
12	176	"
13	201	return to BASIC

*decimal values

Although that gives an impressive demonstration of the speed of machine code this does not seem a very useful routine until you realise that if we fill the colour Ram in the same way, we can instantly set the screen to any combination of foreground and background colours. To change the start of the area filled, we need to change the address in the second and third bytes of the code so that they represent *13352* instead of *12328*. As *12328* is *40 48* and *13352* is *40 52* we actually only need to *Poke 16002* with a new value. At the same time we will arrange to hold the display until you press a key, clear the screen each time, and print the current value of *N*

```
1100 POKE 16002,52
1110 PRINT CHR$(11)
1130 A$=INKEY$:IF A$="" THEN 1130
1140 PRINT N
```

If you Run this modified version, you will be able to set up all the possible combinations of foreground and background colours. Of course, you could do this at any point in your normal Basic programs, provided that you included this short machine code routine, and *Poked* in the appropriate values before calling it with *Usr*.

The other key locations in this fill routine are *16007* and *16008*, which control the number of bytes filled. If you change the values in these, then you can clear only parts of the screen. So far, they contain *192* and *3* (*3*256+192=960*), so if you change *16007* to *0* the last *192* bytes will not be filled. Of course, if you change both the start address and the number of bytes filled, you can fill any section of the screen (and also easily set the whole border).

So far we have put the machine code into memory from address *16000*, but this is not a very safe area as it may be overwritten by your program or variables. The simplest place to put short routines is right at the end of the memory. If you look into locations *14509* and *14510*, you will find the address of the last available byte. On the unexpanded machine this will be *16383* and with an added 16K this will be *32767*.

Strings are stored from this last byte address downwards, so as long as you do not input any strings your code will be safe. But that rather limits your Basic, so it is better to persuade the system that some of the memory has vanished by *Poking* different values into *14509/14510*. We need 14 bytes, so just subtract this number from the value in *14509* and *Poke* it in

```
POKE 14509,(PEEK(14509)-14)
```

Note that this reset of the top of memory will be held unless you carry out a complete reset by pressing *Rst* and then *Rtn* (*Rst* followed by *Ctl C* has no effect on the top of memory value).

You will also have to recalculate where to *Poke* to change the effect of the routine and alter the values in *14340/14341* which tell where your routine starts ■



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Spritely features

Pete Gerrard *examines some of the lesser known features of sprite graphics*

Over the last couple of weeks we've looked at two different aspects of Commodore 64 graphics namely generating your own characters and handling bit mapping of the screen. In this last look at graphics, we'll turn our attention to sprites and discuss some of the lesser known features about them

Your Commodore 64 is capable of defining up to 255 sprites although for screen display purposes a practical limit is eight. This is usually enough for most applications and is what we'll use here. You'll find all the relevant background information in your owner's manual so without further ado let's look at the sprite memory map

The 47 registers that look after sprites start at memory location 53248 and they are defined as shown in the accompanying table

Armed with this knowledge, let's go into a few facts about sprites. Since there are a lot of locations to remember, we usually refer them all to a base location, here called *V* where *V* is equal to 53248. Thus instead of talking about location say, 53279, we talk about location *V* + 31

The data for each sprite is stored in a 64 byte block of memory — although each sprite takes up 63 bytes a further byte is reserved to make life nice and simple for the computer. Commodore call this last byte a place holder: it's another way of saying that 64 bytes is a much easier number for the computer to deal with than 63

To show where the data for each sprite is stored, an appropriate value must be *Poked* into one of the eight memory locations from 2040 to 2047, one for each of the first eight sprites

For instance to tell the computer that sprite 0 is stored in the 13th block of data, we *Poke* 2040 13 where the 13th block starts at memory location (13 * 64), or location 832. Since these eight bytes are capable of holding any number up to 255, we can store sprites anywhere up to a maximum starting location of (255 * 64), or 16320 the end of memory as far as the Vic chip is concerned. We can go further and bank in another block of memory and put sprites in there as long as we don't place them anywhere near the Rom image of the character set

To actually turn the sprite on you need to *Poke* location 53269 or *V* + 21 with the relevant number remembering that all this is handled on a binary basis. Thus *Poking* this location with a 1 turns on sprite 0, with a 2 turns on sprite 1, a 4 for sprite 2, all the way up to 255 which turns on every sprite under the sun

To move them about the screen all you now have to do is update the *X* and *Y* screen co-ordinates, as given in the map earlier. Thus, for sprite zero the *X* co-ordinate is changed by *Poking* location *V* + 0, and the *Y* by *Poking* *V* + 1

Sprites are expanded in the *X* direction as follows

```
POKE 53277, PEEK (53277) OR (2 to the power SN)
```

where *SN* is the sprite number from 0 to 7. In the *Y* direction sprites are expanded with

```
POKE 53271, PEEK (53271) OR (2 to the power SN)
```

To get life back to normal again in the *X* direction

```
POKE 53277, PEEK (53277) AND (255 – (2 to the
  power SN))
```

and in the *Y* direction

```
POKE 53271, PEEK (53271) AND (255 – to the
  power SN))
```

So far we've never moved sprites beyond an *X* co-ordinate of 255, simply because memory locations can't hold values greater than this. However, memory location 53264 allows us to move all the way to the edge in the following manner. When the *X* co-ordinate becomes equal to 255 *Poke* 53264 (or *V* + 16), with a 1, and then reset the *X* values to zero again. Now we're only moving from 256 to 320 or a total of 64 positions so *X* ranges from 0 to 63. When we've finished reset *V* + 16 back to a zero again, to let us move from the left-hand edge of the screen again

Address (53248+)	Description
00	X position of sprite 0
01	Y position of sprite 0
02-15	Bits for sprites 1 through 7
[illegible]	Most Significant Bit of X position More of this one later
[illegible]	Raster Register
[illegible]	X position of Light Pen
[illegible]	Y position of Light Pen
[illegible]	Turn Sprite On
[illegible]	Expand Sprite in Y direction
[illegible]	Memory Pointers
[illegible]	Interrupt Register
[illegible]	Enable interrupt
[illegible]	Sprite Data Priority
[illegible]	Multi colour Sprites
[illegible]	Expand Sprite in X direction
[illegible]	Sprite to Sprite collision
[illegible]	Sprite Data collision
[illegible]	Exterior colour
[illegible]	Background Colour 0
[illegible]	1
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	Sprite multi colour 0
[illegible]	Sprite multi-colour 1
[illegible]	Colour for sprite 0
40-46	Bits for sprites 1 through 7

The priority of each sprite can be controlled from register 53275 (53248 + 27). This register works in exactly the same way as all the others, with sprite 0 being controlled from bit 0, sprite 1 from bit 1, and so on. If the bit is set to zero then the sprite will be displayed instead of anything else: the sprite is in the foreground, in other words

To get the relevant sprite into the background, the bit must be set to 1

Collision is controlled from memory location 53278, or 53248 + 30. Again this works in the same way as all the other locations, and is used to detect collisions between sprites. If the register is showing zero, then nothing has happened, a 3 indicates a collision between sprites 0 and 1, a 6 for sprites 1 and 2 and so on. This is based on the usual manner of selecting sprites from the appropriate bits of a particular byte. Ie

Value	128	64	32	16	8	4	2	1
Bit	7	6	5	4	3	2	1	0
Sprite No	7	6	5	4	3	2	1	0

Thus sprites 2 and 3 are controlled from bits 2 and 3 which respectively give the values of 4 and 8. Therefore, a value of 12 (4 + 8) must be *Poked* into that byte, or indeed read from it, and the relevant action will ensue

Multiple sprite collision is also possible. For instance, if register 53278 returns a value of 82, it means that bits 6, 4 and 1 have been affected or in other words sprites 6, 4 and 1 are involved in a pile-up. A most useful location!

To talk about disabling sprites always reminds me of Norman Hunter but the quick and easy way to turn them all off is to type *Poke V* + 21, 0, but for selective sprites you must use

```
POKE V + 21, PEEK (V + 21) AND (255 – 2 to the
  power of SN)
```

where *SN* is the sprite number from 0 to 7

We've already shown you sprites moving across the screen, just from Basic but they can also be controlled by a joystick. For joystick 1 *S1 = PEEK (56321) – ((S1 AND 16) = 0)* gives a 1 if the fire button is pressed and a 0 if it's not. *((S1 AND 15) = 4) – ((S1 AND 15) = 8)* gives a 1 for moving left, a –1 for moving right, and a 0 if nothing's doing. *((S1 AND 15) = 1) – ((S1 AND 15) – 2)* gives a 1 for moving down, a –1 for moving up and a 0 if nothing's doing

To read joystick 2 let *S2* = 56320, and substitute *S2* for *S1* in all of the previous expressions. Having done that it would be a relatively simple matter to have a sprite controlled joystick game written entirely in Basic

Well, that's it for sprites. Next week a look at music ■

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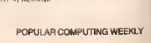
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Meteor

on Spectrum

The object of the game is to guide your man through a series of meteor belts, avoiding the yellow meteors and eating the flashing green apples If you hit a meteor the game ends

As you travel through the belts your score is increasing, but your food is decreasing, this is why you need to eat the apples If your food supply is above 50 then the border will be blue If it is below 50 and above five then you are short on food and the border will be red If your food supply is below five then the border will be green When the border is green you lose control of your man and you just have to hope he misses the meteors but eats an apple This may give you back control You will know this by the border colour

For each apple eaten your food supply goes up by a number between 10 and 30 On the first belt you start with 100 units of fuel

On the second belt you start with 90 units of fuel

On the third belt you start with 80 units of fuel

On the belts four upwards you start with 70 units of fuel

Your controls are 1 to move left
0 to move right

Don t be caught napping at the end when things speed up

Program notes

3-50	Sets up variables
100-167	Sets up screen and scrolls upwards
170-177	Checks to see if your man has hit anything
180-195	Checks how much food you have
200-215	Prints your man boosts up your score and checks if you have any food
220-230	Movement of your man
1200-1350	What it would print if you finish a belt.
1604 1700	What it would print if you hit a meteor
9000-9600	Sets up graphics
150	Makes the computer scroll upwards automatically

```
   3 LET ss=0
   4 LET j=0
   5 BORDER 1  PAPER 1  INK 7  C
LS
   6 GO SUB 9000
   7 LET j=j+1
   8 LET r=100
  10 BORDER 1  PAPER 1  CLS
  11 IF j=2 THEN LET r=r-10
  12 IF j=3 THEN LET r=r-20
  14 IF j>=4 THEN LET r=r-30
  18 LET d=0  LET f=15
  19 LET l=225
  45 FOR q=0 TO 200
  50 LET a=20  LET s=INT (RND*31
)
 100 PRINT INK 6,AT a,s,"●"
 110 PRINT INK 6,AT a,RND*31,"●"
 120 PRINT INK 6,AT a,RND*31,"●"
 130 PRINT INK 6,AT a,RND*31,"●"
 140 LET k=RND*10
 145 IF k>6 THEN PRINT INK 4, FL
ASH 1,AT a,RND*31,"●"
 150 PRINT INK 1,USR 3280
 155 LET l=l-1
 167 IF l=0 THEN GO TO 1200
 170 IF ATTR (d,f)=14 THEN GO TO
1600
 175 IF ATTR (d,f)=140 THEN LET
r=r+INT (RND*20)+10
 177 IF ATTR (d,f)=140 THEN BEEP
.1,10
 180 LET r=r-1
 190 IF r<50 AND r>5 THEN BORDER
2
 195 IF r>50 THEN BORDER 1
 197 IF r<5 THEN BORDER 4
 200 PRINT INK 7,AT d,f,"Ħ"
 207 LET ss=ss+.5
 215 IF r<1 THEN GO TO 1000
 220 IF f>0 AND INKEY$="1" THEN
LET f=f-1
 230 IF f<31 AND INKEY$="0" THEN
 LET f=f+1
1000 NEXT q
1100 GO TO 150
1200 PRINT FLASH 1,AT 8,4,"METEO
R BELT ",j," COMPLETE"
1212 IF r<1 THEN LET r=0
1225 PRINT FLASH 1,AT 10,8,"FOOD
 LEFT = ",r
1250 PRINT FLASH 1,AT 14,3,"PRES
S ANY KEY TO CONTINUE"
1270 PRINT FLASH 1,AT 12,1,"YOUR
 SCORE AT THE MOMENT ",ss
1320 IF INKEY$<>"" THEN GO TO 7
1350 GO TO 1300
1604 PRINT FLASH 1,AT d,f,"Ħ"
1605 FOR f=-50 TO 50 STEP 10
1610 BEEP .1,f
1620 NEXT f
1650 PRINT FLASH 1,AT 8,0,"YOU'V
E BEEN SMASHED BY A METEOR"
1670 PRINT FLASH 1,AT 10,3,"YOU
WERE IN METEOR BELT ",j
1680 PRINT FLASH 1,AT 12,7,"YOUR
 SCORE IS ",ss
1700 PRINT FLASH 1,AT 14,2,"PRES
S ANY KEY TO PLAY AGAIN"
1720 IF INKEY$<>"" THEN RUN
1750 GO TO 1720
9000 FOR p=0 TO 7  READ z  POKE
USR "a"+p,z  NEXT p
9010 FOR p=0 TO 7  READ z  POKE
USR "b"+p,z  NEXT p
9020 FOR p=0 TO 7  READ z  POKE
USR "c"+p,z  NEXT p
9030 FOR p=0 TO 7  READ z  POKE
USR "f"+p,z  NEXT p
9500 DATA 255,BIN 10100101,BIN 1
0011001,255,126,BIN 01100110,66,
BIN 11100111
9510 DATA BIN 00011100,BIN 00111
110,BIN 01111110,255,255,255,BIN
 01111110,BIN 00111100
9520 DATA 0,BIN 01001000,BIN 001
01010,BIN 01000100,1,BIN 0010010
0,BIN 01010010,0
9530 DATA 4,8,126,126,255,126,12
6,BIN 00111100
9600 RETURN
```

Meteor
by Michael Kay

Invert

on Commodore 64

This program is written for the 64 and it enables you to convert everything on the screen to its background colour

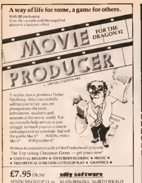
Immediately after you have typed in the program check it and *Save* it because it is in machine code and could cause your computer to crash if incorrect

To run the program type in SYS828 You can use this routine to good effect eg For A = 1 TO 100:SYS828 NEXT

```
1 PRINT  INVERT BY D  SELWOOD
2 DATA 169 0 168 133 252 169 4 133 253 177
  252 24 105 128
3 DATA 145 252 166 252,232,208 2,230 253,134
  252 224 232
4 DATA 208 236 166 253,224 7 208,230 96
5 FOR P = 828 TO 883 READ M POKE P,M NEXT
```

```
LDAIM   0     INX
TAY           BNE     2
STAZ    252   INCZ    253
LDAIM   4     STXZ    252
STAZ    253   CPXIM   232
LDAIY   252   BNE     236
CLC           LDXZ    253
ADCIM   128   CPXIM   7
STAIY   252   BNE     230
LDXZ    252   RTS
```

Invert
by D Selwood


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Moire

on Dragon

The program draws lines on the screen starting from the four corners. The lines are four pixels apart and because of their closeness, they form a Moire pattern on the screen. Interesting results can be obtained by changing the *Pmode* and making the lines a random colour.

```
10 PMODE 4,1:SCREEN 1,1:PCLS

20 FOR A=1 TO 255 STEP 4:LINE(0,191)-(A,0),PSET:NEXT A
30 FOR A=255 TO 1 STEP-4
40 LINE(255,191)-(A,0),PSET:NEXT A
50 FOR A=1 TO 255 STEP 4:LINE(0,0)-(A,191),PSET:NEXT A
60 FOR A=255 TO 1 STEP-4:LINE(255,0)-(A,191),PSET:NEXT A
70 GOTO 70
```

Moire
by David Grey

Seeing Stars

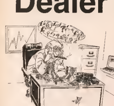
on Lynx

This is a game for one player in which you must destroy a moving target. The program will ask you how many shots you want and how fast the target should go. At the end you will be told how many you have scored.

```
100 CLS
110 PRINT "   E   E  WITH THE DELETE KEY"
120 BEEP 500,500
130 CLS
140 VDU 24
150 PRINT "INPUT NUMBER OF SHOTS  1 100"
160 INPUT I
170 IF I 1 THEN GOTO 160
180 CLS
190 PRINT "ENTER SPEED FACTOR OF TARGET          1 (HARD)  5000 (EA   )"
200 INPUT F
210 IF F   OR F  5000 THEN GOTO 200
220 VDU 25
230 LET U=121
240 LET   =0
250 LET H=0
270 LET W=0
280  LC
290 FOR T=0 TO 1 5 STEP 4
310 LET A=INT(RND*2
320 IF A=0 THEN LET U=U+10
330 IF A=1 THEN LET U=U-10
340 IF U>232 THEN LET U=121
350 IF A  10 THEN LET U=121
360 PRINT@ T,U;    ;
370 PAUSE F
380 PRINT@ T U;
390 PRINT@   A 0  Y
400 MOVE 12  10
420 IF   =1 THEN DRAW 12  242
440 IF C=1 AND T=60 THEN LET H=1
450 IF H=1 THEN GOTO 590
460 IF H=1 THEN PRINT@ T U;    ;
470 IF H=1 THEN LET T=0
480 IF H=1 THEN BEEP 100,40,63
510 IF H=J THEN GOTO 600
520 LET H=0
530 INK 0
590 FOR P=1 TO 5
620 DRAW T+INT(RND*100)
630 DRAW T-INT(RND*100 ,U-INT(RND*30)
640 BEEP INT(RND*5000 ,INT(RND*10) 63
650 NEXT P
670 GOTO 4 0
690 VDU 24
710 PRINT OUT OF A POSSIBLE ;J*100; POINTS
750 FOR P=0 TO 7
760 INK P
770 PRINT@ 26,125; DO YOU WANT ANOTHER GAME?
780 BEEP P*INT(RND*100) 30,63
790 NEXT P
800 IF GET$= Y  THEN RUN
805 ELSE END
810 REM **************
820 REM * IAN BARLOW *
840 REM **************
```

Seeing Stars
by Ian Barlow

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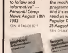
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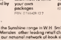
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Renumber

on Vic20

This small routine will renumber any Oric program written in Basic. It will run on the 16K or 48K Oric and it should be placed before the main program. This should not be any great problem as it was written so that it would be able to fit into one line and therefore does not renumber *Gotos* and *Gosubs*

```
10 A=#501
20 INPUT"START AT.,";X
30 INPUT"STEP.,";Y
40 REPEAT
50 B=DEEK(A)
60 DOKE A+2,X
70 X=X+Y:A=B
80 UNTIL A=0
90 END
```

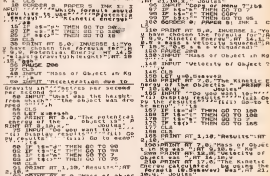
Renumber
by Gary Gray

Physics

on Spectrum

The program collects together a number of useful formula calculations for potential and kinetic energy.

Using your figures the program will then calculate mass acceleration and object velocity. If you have a printer you can copy out the results.



```
   5 REM Physics
   7 CLS : BORDER 0: PAPER 5: INK 1: CLS
  10 BORDER 0: PAPER 5: INK 5: INPUT ''''''''"Which formula would you like to use"''''''"P(otential energy)"''''"K(inetic energy)"''''',a$
  15 IF a$="p" THEN GO TO 30
  20 IF a$="k" THEN GO TO 100
  25 IF a$<>"" THEN GO TO 10
  30 CLS
  35 PRINT AT 5,0, INVERSE 1;"You have chosen the formula for",AT 9,9,"Potential Energy",AT 14,5,"m(ass)g(ravity)h(eight)",AT 10,15,"mgh"
  36 PAUSE 200
  37 CLS
  40 INPUT "Mass of Object in Kg ?"''',m
  50 INPUT "Acceleration due to Gravity in"''"metres per second per second ?"''',g
  60 INPUT "What was the height from which"''"the object was dropped ?"''',h
  65 CLS
  66 LET x=m*g*h
  70 PRINT AT 5,0,"The potential energy of the      object is": PRINT AT 8,10,x,"      Joules",,
  75 INPUT "Do you want to :"''"(i) Display results"''''"(ii) Copy results"''''(iii) Go to menu"'''',t$
  80 IF t$="d" THEN GO TO 90
  82 IF t$="c" THEN GO TO 90
  84 IF t$="m" THEN GO TO 7
  85 IF t$<>"" THEN GO TO 75
  90 CLS
  91 PRINT AT 1,10,"Results";AT 2,10,"_______"
  92 PRINT AT 5,0,"Mass of object in Kg was ",AT 7,10,,m," Kg"
  93 PRINT AT 9,0,"Acceleration due to gravity in  metres per second per second was ",AT 12,10,g
  94 PRINT AT 14,0,"The height from which the objectwas dropped was ",AT 17,10,h," metres"
  95 PRINT AT 19,0,"The potential energy of this    object was ",AT 21,10,x," Joules"
  96 INPUT "Copy or Menu ?";b$
  97 IF b$="m" THEN GO TO 7
  98 IF b$="c" THEN COPY
  99 IF b$<>"" THEN GO TO 95
 100 BORDER 0: PAPER 5: INK 1: CLS
 110 PRINT AT 5,0, INVERSE 1,"You have chosen the formula for";AT 9,9,"Kinetic Energy",AT 14,1,"0.5 * mass * velocity squared",AT 18,5,"0.5 * m * v(squared)"
 120 PAUSE 200
 130 INPUT "Mass of Object in Kg ?"''',m
 140 INPUT "Velocity of Object ?"''',v
 145 CLS
 150 LET y=0.5*m*v↑2
 160 PRINT AT 7,0,"The Kinetic Energy of the Objectis ": PRINT AT 10,10,y,"          Joules"
 165 INPUT "Do you want to:"''"(i) Display results"''''"(ii) Copy the results"''''"(iii) Go to the menu",''',t$
 167 IF t$="d" THEN GO TO 180
 169 IF t$="c" THEN GO TO 180
 170 IF t$="m" THEN GO TO 7
 172 IF t$<>"" THEN GO TO 165
 177 CLS
 180 CLS
 185 PRINT AT 1,10,"Results":AT 2,10,"_______"
 190 PRINT AT 7,0,"Mass of Object in Kg was ";AT 9,10,m," Kg"
 200 PRINT AT 12,0,"Velocity of Object was ",AT 14,10,v
 210 PRINT AT 17,0,"The Kinetic Energy calculated  by using the formula (0.5*m*v*v) was",AT 21,10,y;" Joules"
 220 INPUT "Copy or menu ?",b$
 230 IF b$="m" THEN GO TO 7
 240 IF b$="c" THEN COPY
 250 IF b$<>"" THEN GO TO 220
```

Physics
by C Oliver

Entrapment

on BBC

This game is for the model B with joysticks. The game is for two players and full instructions are included in the program. Note that the joysticks are to be held with the fire button facing towards you. You will find that the lines move diagonally most of the time and to move in a straight line you will have to move the joystick between the two sectors.

PROGRAM OF THE WEEK

```
10ONERROR MODE7:REPORT:PRINT" at line
   ";ERL:END
20VDU23,1,0;0;0;0;
30VDU23,227,255,255,255,255,255,
   255,255,255
40VDU23,233,153,126,24,165,165,24,126,153,
   23,234,66,126,24,102,102,24,126,66
50VDU23,235,66,102,24,90,90,24,102,66,23,
   236,66,36,24,66,66,24,36,66
60VDU23,237,0,36,24,36,36,24,36,0,23,238,
   0,0,24,24,24,24,0,0
70ENVELOPE1,3,0,0,0,1,1,1,127,0,0,-1,126,0
80
90
100MODE7
110PROCIntro
120MODE2:VDU23,1,0;0;0;0;
130PROCSet_Up
140PROCGame
150GOTO100
160
170
180DEFPROCIntro
190FORI=1TO2:PRINTTAB(8,1);CHR$141CHR$157
   CHR$134;"E N T R A P M E N T. "CHR$15
   6:NEXT
200FORI=3TO23:PRINTTAB(0,1)CHR$134CHR$157
   :NEXT
210VDU28,2,23,39,3
220C$=CHR$135
230PRINT C$;"The objec of this game is
   to move"
240PRINTC$;"a growing life_line into a
   free space";
250PRINTC$;"on the screen. That is space
   not"
260PRINTC$;"taken up by your own  tail ,
   your"
270PRINTC$;"opponent's 'tail' or the
   boundaries"
280PRINTC$;"of the screen.As the screen
   gradually";
290PRINTC$;"fills, so certain areas of
   it are cut";
300PRINTC$;"off from one or both players.
   The"
310PRINTC$;"winner is the player who can
   cut his"
320PRINTC$;"opponent off with the least
   space to"
330PRINTC$;"play with. And then just avoid"
340PRINTC$;"mistakes until his opponent
   runs out"
350PRINTC$;"of room and is forced to
   hit an'
360PRINTC$;"existing line' Take care
   not to"
370PRINTC$;"reverse direction, as this
   is judged"
380PRINTC$;"as running back into your
   own tail !"
390PRINT CHR$136CHR$131" PRESS BOTH
   BUTTONS ON JOYSTICK"
400PRINTCHR$136CHR$131TAB(14)"TO START"
410REPEAT X=ADVAL(0)AND3:UNTIL X=3
420ENDPROC
450DEFPROCSet_Up
460P1X=1000:P1Y=800:P1C=7:P2X=200:P2Y=
   300:P2C=3:C1X=0:C1Y=0:C2X=0:C2Y=0
470GCOL0,2
480MOVE0,0:MOVE0,30:PLOT85,1279,0:MOVE0,
   30:PLOT85,1279,30
490MOVE0,30:MOVE40,30:PLOT85,0,1023:MOVE40
   ,30:PLOT85,40,1023
500MOVE40,1023:MOVE40,990:PLOT85,1260,
   1023:MOVE40,990:PLOT85,1260,990
510MOVE1279,30:MOVE1240,30:PLOT85,1279,
   1023:MOVE1240,30:PLOT85,1240,1023
520GCOL0,P1C:PLOT69,P1X,P1Y:GCOL0,P2C:
   PLOT69,P2X,P2Y
530COLOUR3:PRINTTAB(5,3)"COUNT DOWN"
540FORI=5TO0STEP-1:PRINTTAB(10,5);I
550SOUND1,-15,I*5,1:FORD=1TO1000:NEXT,
560COLOUR0:PRINTTAB(5,3);SPC(10);TAB(10,5)"
570ENDPROC
600DEFPROCGame
610S1X=P1X:S1Y=P1Y:S2X=P2X:S2Y=P2Y
620IFADVAL(1)<32000 C1X=P1X-4:C1Y=P1Y:
   P1X=P1X-4
630IFADVAL(1)>32000 C1X=P1X+4:C1Y=P1Y:
   P1X=P1X+4
640IFADVAL(2)<32000 C1X=P1X:C1Y=P1Y+4:
   P1Y=P1Y+4
650IFADVAL(2)>32000 C1X=P1X:C1Y=P1Y-4:
   P1Y=P1Y-4
660IFADVAL(3)<32000 C2X=P2X-4:C2Y=P2Y:
   P2X=P2X-4
670IFADVAL(3)>32000 C2X=P2X+4:C2Y=P2Y:
   P2X=P2X+4
680IFADVAL(4)<32000 C2X=P2X:C2Y=P2Y+4:
   P2Y=P2Y+4
690IFADVAL(4)>32000 C2X=P2X:C2Y=P2Y-4:
   P2Y=P2Y-4
700IFPOINT(C1X,C1Y)<>0 PROCExplosion(1):
   ENDPROC
710IFPOINT(C2X,C2Y)<>0 PROCExplosion(2):
   ENDPROC
720GCOL0,P1C:MOVES1X,S1Y:DRAWP1X,P1Y
730GCOL0,P2C:MOVES2X,S2Y:DRAWP2X,P2Y
740SOUND1,-10,P1Y/5,1:SOUND2,-10,P2Y/5,1
750GOTO610
780DEFPROCExplosion(PLAYER)
790VDU5
800IF PLAYER=1 X=P1X-18:Y=P1Y+15 ELSE IF
   PLAYER =2 X=P2X-18:Y=P2Y+15 '
810SOUND0,1,6,10
820FORI=233TO238:GCOL0,7:MOVEX,Y:PRINTCHR$I
830FORD=1TO200:NEXT:GCOL0,0:MOVEX,Y:
   PRINTCHR$227:NEXT
840VDU4:COLOUR6:VDU23,1,0;0;0;0;
850IFPLAYER=2 VDU19,P1C,9,0,0,0:PRINTTAB
   (1,5);"WHITE WON THE GAME"
860IFPLAYER=1 VDU19,P2C,11,0,0,0:PRINTTAB
   (1,5);"YELLOW WON THE GAME"
870FORI=1TO5:SOUND1,-15,100,8:SOUND1,0,0,
   5:NEXT
880FORD=1TO4000:NEXT
890ENDPROC
```

Entrapment
by Kevin Boyd

Astro Dodge

on Dragon 32

Using the right hand joystick the player must guide their spaceship at the top of the screen down through a constantly changing asteroid belt without hitting any of the asteroids

Program notes

50	Sets high score to zero.
60	Sets asteroids to type 1
70	Sets score to zero
90 120	Sets speed
150	Sets graphics for space ship
140 240	Decides which graphics to use for asteroids and prints it
250 270	Checks for movement of joystick
290-310	Checks for crash into asteroid
320	Tests timer if greater than 1000 then selects new level
330	Delay loop
350-480	End routine calculates score prints score hi-score and asks for input for another go

```
10 '****************************
20 '********ASTRO.  DODGE********
30 '***BY A.F.GRANGER MARCH 83***
40 '****************************
50 H=0
60 X=# 1
70 S=0
80 CLS1
90 PRINT@35,"FAST OR SLOW SPEED?"
100 A$=INKEY$
110 IF A$="F" THEN I1=0:GOTO150
120 IF A$="S" THEN I1=20:GOTO150
130 PLAY"V2L5003A"
140 GOTO100
150 A$=" "+CHR$(134)+CHR$(137)+" "
160 CLS:PRINT@260,"here we go":PLAY"
    V15L50ABCDEFGFDECBA":CLS1
170 IF X=1 THENB$=CHR$(140+16)
180 TIMER=0
190 IF X=5 THEN S=S+5000:X=1:
    I1=0:GOTO170
200 IF X>1 THEN S=S+1000
210 IF X=2 THEN B$=CHR$(135+32)+
    CHR$(139+48)
220 IF X=3 THEN B$=CHR$(143+16)+"*"
    +CHR$(143+16)
230 IF X=4 THEN B$=CHR$(140+48)+
240 PRINT@(RND(27)+480),B$
CHR$(140+16)+CHR$(140+32)
250 A=JOYSTK(0)
260 IF A>50 THEN A=50
270 PRINT@(A/2),A$
280 FORI=1 TO 3
290 IF POINT(A+1,2)>1 THEN 350
300 PLAY"V504L200A"
310 NEXTI
320 IF TIMER>1000 THEN X=X+1:
    GOTO 170
330 FORI=1 TO I1:NEXTI
340 GOTO240
350 'FINISH
360 T=TIMER
370 S=S+T
380 CLS
390 PRINT@36,"--you crashed--"
400 PLAY"L10005GFEDCBA04GFEDCBA03G
    FEDCBA02GFEDCBA01GFEDCBA"
410 PRINT@101,"YOUR SCORE=";S
420 IF S>H THEN H=S
430 PRINT@258,"HIGH SCORE=";H
440 PRINT@417,"ANOTHER GO?"
450 A$=INKEY$
460 IF A$="Y" THEN 60
470 IF A$="N" THEN END
480 PLAY"V2L5003A"
490 GOTO450
```

Astro Dodge
by A Granger

Microradio

GW6JJN

Communications

So what does this all have to do with CB radio I am asked Well many amateurs come up from CB having tasted the delights of communication It is simplicity itself to send a program to a friend Just hold the microphone by the tape recorder speaker and transmit it The happy friend records the received transmission and loads it into his micro Great fun Only one problem The CB licence unlike the amateur licence says that communication must be in speech only I've heard some funny sounds on CB though

A small exam must be passed to get the amateur licence, a City and Guilds exam, in fact and this takes the form of multiple choice questions Since this is the case I must point you in the direction of your local bookshop and an excellent publication called *The Working Spectrum* published by Sunshine This book contains a listing called *Multi Q* which could be adapted to any micro and will suitably filled with the correct questions from a local amateur get you through

But I digress Back to the satellites The information that we need to point the aerial is firstly the azimuth, which is the bearing north south-east etc and secondly the elevation how high, or even how low, it is Whether in fact it is even above the horizon These figures can be worked out from tables but when these tables are in the computer then it is a simple matter for the computer to calculate the azimuth and elevation The information as I said last week can be had from AMSAT UK, as can a listing

So, why bother to track them at all? Well, the amateur satellites have transponders on board These are automatic radio tranceivers which receive on the Two Metre band at 145 85Mhz and then transmit the signal on the Ten Metre band around 29 4Mhz The satellite itself consists largely of solar cells and batteries, that are charged whenever it is in sunlight, and the transponders of course The satellite also carries a beacon which gives a continuous identifying signal And speaking of beacons we'll mention those next week land based ones that is and whatever are amateur repeaters and how can the micro keep track of them all? Which way do we point the aerial and whatever is a QTH square? Stay tuned ■

Ray Berry GW6JJN

This series of articles is designed for radio and microcomputer enthusiasts alike If you have any queries that you want answered hints and tips to share or topics that you would like to see covered write to Ray Berry Microradio *Popular Computing Weekly* 12 13 Little Newport Street, London WC2R 3LD

Area finder

on ZX81

This little program will work on the 1K machine. First, the program draws a small or big rectangle. After this the computer gives the length and height of the rectangle. Your job is to find the area by multiplying the length by the height. If you are right the computer will congratulate you. But if you get it wrong the computer will tell you the right answer and you will get the chance to try again. This program is fairly easy and aged for the ten and unders.

Program notes

10-30	Set up the variables
40-75	Draws the rectangle
80-90	Writes length and height
130-170	Are you right or wrong?

```
   1 CLS
  10 LET A=INT (RND*16)+6
  20 LET B=0
  25 LET D=INT (RND*10)+5
  30 FOR C=0 TO A
  40 PRINT AT B,C,"■"
  50 NEXT C
  60 LET B=B+1
  70 IF B=D THEN GO TO 80
  75 GO TO 30
  80 PRINT AT 19,0,"LENGTH OF RE
CTANGLE=",A
  90 PRINT AT 20,0,"HEIGHT OF RE
CTANGLE=",D
 100 PRINT AT 21,0,"AREA=",
 105 INPUT E
 110 PRINT E
 120 IF E=A*D THEN GO TO 150
 125 CLS
 130 PRINT "WRONG IT WAS ";A*D;"
 AGAIN? (Y/N)"
 140 INPUT A$
 141 IF A$="Y" THEN GO TO 1
 142 CLS
 143 PRINT AT 10,6,"-*-*AREA FIN
DER*-*-";AT 11,10,"BY IAN SMITH"
 149 STOP
 150 PRINT AT 16,0,"-*-*-*-*-GOO
D-*-*-*-*-"
 160 PAUSE 100
 170 GO TO 1
```

Area Finder
by Ian Smith

The Quill

Despite the recent unsettling news from Meltoy/Dragon programmers seem to be happy to keep publishing programs for the Dragon 32. Just released are several adventures for the machine, and the first one comes from Virgin Games.

Castle Adventure, written by 14½-year old Conrad Jacobson, takes place in that favourite location of adventure writers and follows the traditional path of the text adventure. It seems, as far as I could tell on first playing, a "passive" game — that is there is no D&D style combat with monsters. Instead the player has to solve the usual kind of adventure problem.

The program's responses occasionally get a little childish, witness the rather tiresome "eh! what? pardon! sorry" which comes up every time the wrong key is pressed or an illegal command typed in. Jacobson has obviously boned up on his ancient architecture, with terms like "machicolated walkway" (which has holes in so that arrows may be shot at unwary enemies) and "garderobe" (the smallest room in the castle). An educational adventure!

Although the program is logical, the player will often find himself, for example, tripping over the cassette recorder left lying around by some careless knight. Of course, next time it can be picked up (and will be useful), but a few steps later something else will put an early end to the unwary player. I wonder if Virgin have Jacobson locked up in the Donjon, working on the next one?

Peaksoft, up in Burton-on-Trent, has written two new adventures for the Dragon 32. Both are included on one tape, at £5.45, which would seem to be good value.

Towers of Death is loaded first, followed by *The Ice Kingdom*, and then the player is asked to make his choice of which game to play. Both are in the traditional text mould and both start off in a quiet, warm village. The player has to make his way to the towers in the first game, to test the legend of the Obsidian towers (I assume that solving the adventure will make all that clear!) while in the second, the tome of understanding, no less, is the object of the quest. Along the way, of course, useful items may be picked up to be used further along in the adventure.

The programs stick rigidly to a two-word command and will ignore anything else. Instead of silliness when faced with an illegal command, the programs rather intelligently point out where the player has gone wrong, asking for another verb or noun, as the case may be — although Peaksoft call *Examine* a noun!

The dreaded "random element" shows up occasionally, and the author (Clive Johnson) himself pokes fun at the unfairness of this rather dated device, as in "would you believe a pack of ghouls tear you to pieces? Fraid so!"

Dungeon Software has some interesting looking things coming up. Although I have not yet seen them, the range, written by Mike Melneck, appears to cater for everyone. *Giant's Castle* is especially for younger players and features simple graphics, and a simple game format. Next up the scale comes *Treasure Tombe* (sic) which is a graphics adventure for the "Eagle reader age-group". Then *Temple of Zoren*, which is a science fiction adventure for *Star Wars* fans, and *Trekkies Crystal Chalice* and its sequel *Return of the Klarz* are text adventures with complex swords and sorcery type scenarios.

That all sounds rather ambitious, and I'll be reporting in the near future on how Dungeon have fared.

In *PCW* No 39, I had to look at the books available on the subject of adventuring (I found that there were not many!). Browsing through the bookshop on the way through a mainline station in London, I came across a range of paperbacks from TSR. This American company, Tactical Studies Rules, was the originator, in the 1970s, of *Dungeons and Dragons*, and they have now written a series of scenarios which reflect the atmosphere of the D&D world. Like the books of Ian Livingstone and Steve Jackson that I mentioned in No 39, the books give the reader the chance to manipulate his own story-line. The new books unfortunately do not allow the reader player to do anything more than pick one of the multiple choices (the Livingstone/Jackson series require the player to throw dice and indulge in blow-by-blow combat with monsters, and generally form more of a game), but are a good read.

Cash prizes for solving adventures don't seem to have taken off, for some reason. *Castle of Riddles* from Acornsoft was launched with the offer of a prize to the first adventurer to solve the game, and there is, of course, the seemingly perennial *Pimania* (will it ever be won?), but that is about it. A few other programs have offered prizes for the first solution — Artic offered a large cash prize to the first person who kracked *Krackit*, but I saw no mention of a winner, and the contest may well still be open. Back in the days of the ZX81, a program called *Lojix* also offered a prize. There are probably a few other games that give this sort of incentive, but strangely, apart from the two mentioned, no adventures (that I know of!).

I suspect that one of the reasons for this state of affairs is sheer playability. To make the adventure difficult enough to make a reasonable challenge would necessarily make it too hard for the majority of players — and too easy would not make for a good competition. *Castle of Riddles* is a good adventure, and seems to be keeping many people busy with its problems long after the prize has been collected — how much better to take it nice and slowly, wandering through the program over several months, exploring all the little by-ways on the way to the final solution, than to rush through it as fast as possible on the way to the prize.

For all those who played and enjoyed Abersoft's *Adventure 1*, a bit of news from the Welsh-based company who have teamed up with a London company, Mordon Games Design, to create a new program called *Mordon's Quest*. Abersoft tell me that *Mordon's Quest* "should definitely tax the most seasoned adventurer", being a text only program available, I'm glad to see, for a wide range of micros.

Still on the subject of new programs (can adventure games be taking over from arcades?), Gilsoft recently sent their new *Adventure Editor* to the office. Running on a Spectrum 48K, this program is nothing less than a system for the adventurer to write his own adventure. Using *The Quill*, which is the name that Gilsoft gives to its Editor, anyone without computing knowledge may create his or her own program. Two major programs have recently been released, by Quicksilva and Melbourne House, to enable the complete beginner to design arcade games, and *The Quill* is set to do the same for adventures.

No *Hobbits* here, of course — the user certainly can't create graphics. But text adventures have many devotees, and these can indeed be written with *The Quill*. After planning the scenario of the game on paper, the user then goes on to define all the locations with the appropriate text, the objects to be placed within the complex, the movements allowed and the conditions to be met within the game.

I've had the program for one or two weeks now, and have written a couple of simple text adventures, but with a bit more thought, some very complex games could be written. And Gilsoft ask only a mention if you decide to market your Quill written adventure commercially.

The Quill obviously deserves a more in-depth look, and I'll return to it later. ■

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further, write to Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.



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ROBOTIC DRAGON

Jason Farmer of Tenterden Kent writes

Q I have a Dragon 32 which I am very happy with. I am interested in Robots and how they work and would like to know if it is possible to attach a Robot to my Dragon? If so, where can I get one and how much would it cost? It could be in kit form as I have access to an experienced electrician.

A The two companies in this area at the moment are Powertran and Colne Robotics. Both sell Robotic arms. The Colne one is more flexible but at about £400 is twice the price of the Powertran arm. Perhaps more what you had in mind is the Zeaker also by Colne. This was originally designed for the Spectrum, but is now available on the Dragon. It is a sort of turtle, which can use *Logo*. It costs £50 as a kit, or £70 if you buy it ready built.

CHEQUERED FLAG

E McLucas of Highlight Lane, Barry, S Glamorgan, writes

Q I am the owner of a ZX Spectrum. Although I have read the manual I am unable to get user defined graphics. Please can you help?

A This subject often crops up, so it's worth going into some detail. The mistake that is most commonly made is to forget that when you *Print* the new graphic that you have created, you must be in Graphics mode, which in my example means that in line 110 you open the inverted commas and then press *Shift/9* to get an inverse *G* cursor, then press the letter a. Run the program and list it: your a has become a chequered pattern.

```
10 FOR z = 0 TO 7
20 READ m
30 POKE USR "a"+z,m
40 NEXT z
50 FOR y = 0 TO 7
60 READ n
70 POKE USR "b"+y,n
80 NEXT y
90 BORDER 6
100 FOR w = 1 TO 352
110 PRINT PAPER 2; INK 6; "a";
120 PRINT PAPER 6; INK 2; "b";
130 NEXT w
200 DATA BIN 10101010, BIN 0101
    0101, BIN 10101010, BIN 0101
    0101, BIN 10101010, BIN 0101
    0101, BIN 10101010, BIN 0101
    0101
210 DATA BIN 01010101, BIN 10101-
    010, BIN 01010101, BIN 10101
    010, BIN 01010101, BIN 10101-
    010, BIN 01010101, BIN 10101
    010
```

Your best option is to enter lines 10 to 40, line 110, and line 200 only, to start with. When you have *Run* this once start changing just the first two *Bin* statements in line 200 to all ones, or noughts. If you change it to all ones, then you will find that the top of the chequered flag is now a solid line. You could write the *Data* and *Bin* statements like this (though it would take up more memory)

```
200 DATA BIN 10101010
201 DATA BIN 01010101
202 DATA BIN 10101010
203 DATA BIN 01010101
204 DATA BIN 10101010
205 DATA BIN 01010101
206 DATA BIN 10101010
207 DATA BIN 01010101
```

I have closed up the spacing so it is easier to see the chequered pattern. Imagine that each *1* is a black square (*Ink*), and that each *0* is the background or *Paper*. Now try this

```
200 DATA BIN 00000000
201 DATA BIN 00001000
202 DATA BIN 00111110
203 DATA BIN 00101000
204 DATA BIN 00111110
205 DATA BIN 00001010
206 DATA BIN 00111110
207 DATA BIN 00001000
```

Recognise it? Try and concentrate on the ones. Well, as the noughts are *Paper* they are just background so

```
200
201         1
202       11111
203       1 1
204       11111
205         1 1
206       11111
207         1
```

The dollar sign. I hope that these examples will make the manual clearer. The first four lines of the program are a simple loop, and the form is repeated in lines 50 to 80. Do not forget that when you *Print* a and b in lines 110 and 120 you must be in graphics mode.

FX CALL

G Oulden of Pamir Road, Southwick Brighton writes

Q I have a BBC computer and am very happy with it. I am interested in using the speech synthesizer, and have been told that I will need to use the FX call *209, x. I do not know what this call does, can you help?

A You do not actually need to use the FX call at all, because you can access the synthesizer by using the *Sound* command, except giving the channel a value of —1. The FX would only be of use if you wished to turn the synthesizer off. The given values are 32 for off, and 80 for on, but in fact, anything other than 80 will turn it off.

VOLT LOADS

Emma Anderson of Highfields, Feltham Middlesex writes

Q Can you tell me what the difference is between the RS232 and the RS232c interface?

A The RS232 is an internationally recognised standard for the transmission of data one bit at a time, ie, it is serial. The difference between the two types is a matter of the potential loading on the lines. The RS232 can carry 5 volts and 0 volts only whilst the RS232c carries +12 volts and −12 volts.

This does make a difference in some circumstances, for example, only the RS232c can be used with a modem, but for some other purposes you need the 5 volt and 0 volt loads only carried by the RS232.

ATARI INFO

Paul J Maddock of Lyndhurst Road, Great Crosby, Liverpool L23 writes

Q Please could you give me some information on the new Atari 600XL. I would like to know the User Ram and what the *Help* key does? Do you need a special tape deck, and is it compatible with other Atari cassettes and cartridges? Also does the sound have *Envelope* as well?

A The Ram on the Atari 600XL is 16K, while the 800XL has 64K. It has 16 screen modes, 11 of which are for graphics. Like all computers the higher the graphic mode the more of the Ram it uses, and the less left for the User. I do not know how much Ram the various screen modes take up, though I would expect it to be similar to the 400 and 600.

You will need a special tape recorder for the 600XL but all the existing Atari software is compatible. There is no *Envelope* command as such, although you could achieve the desired alteration to the sound through machine code.

The *Help* key is an extension of the error codes. It lists the line where the problem has occurred.

ZX81 FROGGER

Dennis Farmer of Headley Avenue, Garston writes

Q I have a ZX81 with 16K Ram pack, and find I can get most of the programs I want, but I would like to play Frogger and haven't been able to find a version for my micro. Can you help?

A The ZX81 is still a popular machine but the only version of Frogger that I have found for the ZX81 is by DJL. Their address is 9 Tweed Close, Swindon, Wiltshire.

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW*, 12-13 Little Newport Street, London WC2R 3LD.



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ZX81 File 60 keyboard £75 as new ZX81 chicken uses all 16K nine skill levels and all features of original games only £1 50 Tel Ian 01-448 2663

ZX81 (1K) sell for £20 Tel Swingley (85) 280

ZX81 1K plus software and books £30 ono Tel Maidewich 3406

ZX81 plus 16K (starter pack) Only four weeks old Tel 01 572 1565

16K ZX81 with File 60 Keyboard three games + cassette recorder £50 ono Farnborough 56868

ZX81 with 16K Ram pack + manuals excellent condition will accept £35 Tel North Weald 2664

ZX81 16K FILE 60 KEYBOARD, 13 cassettes including Mazogs Codfish Attack ZX Chess 2 Flight Simulation hi-res 26 magazines manual language book ideal Christmas present, bargain at £80 Tel 01-427 2563 evenings only

ZX81 16K + Dragon 32 + £40 software + £12 books swap or sell Tel 437 1247 anytime

ZX81 16K + input and output synthesiser board carry case/console + software cassettes etc cost £190 sell for £75 ono Tel 061-428 7825 after 6 pm

Commodores for sale

VIC20 CARTRIDGE Adventureland swap for another adventure or sell for £15 (0203) 348759

VIC20 + 3K cassette unit joystick super expander four games cartridges over 20 cassettes of software many mags and four books worth £300 sell for £120 Tel Talsfield 854 (evenings)

VIC20 plus cassette deck extra 3K Ram Sargon 2 Chess instruction book, all leads programmers ref guide joystick + 4 number of games cassettes excellent condition £135 ono Tel 0256 56154

VIC20, cassette unit super expander monitor cartridge joystick £100 s w books all boxed as new £175 ono Tel Herne Bay 67803

VIC20 + cassette unit + Basic part one + games cassette £100 ono Tel Mark 01-664 7953 (eves)

VIC20 16K, cassette deck intro to Basic P E I joystick, 6 cassettes, £135 Tel (Luton) 0632 37854

VIC20 + C2N cassette deck 16K Ram pack four cartridges + mother board joystick + over £50 software including 'matrix, Laserzone all boxed ask for £160 Tel (08696) 6617

SWAP VIC20 + cassette + joystick + 8K and 3K Ram packs + cartridges and tapes for Atari 400 or 800 Phone Crick 822661

VIC20 — C2N cassette unit, joystick 3 cartridges (Gorf Chess Adventure) + books cassette (Arcadia Skramble) and mags will sell mags separately package worth £195 Offers? Ring Tadburn 2484 (evenings)

VIC20 stack 4 slot motherboard Built plus super expander books tapes new £220 will accept £160 ono Also Gen e I + 1 5K Rom interface cable for Epson MX printer £160 ono Tel 061 764 3165

COMMODORE 64K Vic20 + C2N tape deck + 3K Ram expansion + 8K Ram expansion + joystick + lots of software £160 Tel 070-467 0057

VIC20 16K joystick, super expander C2N + £220 software altogether worth £300 sell for £155 Tel 0883 270920

VIC20 21K C2N with over £100 software cost £530 sell £150 sale £100 Spectrum software including Styx Arcadia etc sell £36 Write to 60 Minerva Close Latchford Warrington Cheshire

VIC20 SOFTWARE. Gamble Meteor Defender Tracks Moons of Jupiter and Space Attack. £4 50 each Tel Billericay 56861

VIC20 + cassette deck, £80 ono Tel 70623 Thurrock after 6 pm

VIC20 C2N UNIT, joystick & cartridge guarantee £80 Tel 091 772 7065

COMMODORE VIC20 one month old with C2N games + lots of books with guarantee £135 Tel 0506 414432

VIC20 + C2N tape recorder Commodore 16K Ram pack + Adventure cartridge + books of programs + 10 games tapes including Chess Scramble Krazy Kong + dust cover boxed £130 Tel 01 573 5156

COMMODORE 64 with cassette deck + £48 of software £280 Tel Potters Bar 56772 after 5 pm

SWAP VIC20 CHOP LIFTER cartridge for Spiders of Mars or Cut World also Alien cartridge for Mole Attack also cassette swap Tel Yateley 872310

COMMODORE VIC20 + cassette unit 8K Ram pack super expander joystick Sargon II Chess cartridge + six software cassettes £120 ono Tel Port Talbot 696843 evenings

VIC20 + cassette unit 16K expansion joystick arcade + educational software magazines and books swap for BBC Model B must be as new or sell for £200 Tel Wakefield (0924) 253265

VIC20 + C2N cassette deck + joystick + over £50 software + books + many magazines original value over £300 bargain at £150 ono original boxing good condition Tel Dorking (Surrey) 887536 evenings only

Dragons for sale

DRAGON 32 SOFTWARE Telewriter £27 50 Compusense Dasm-Demon £15 Books Programming the 6809 (Zaks) £8 6809 Cookbook (Warren) £5 The Working Dragon (David Lawrence) £3 Tel Rustington (09062) 72845

DRAGON SOFTWARE hi-res cartridge £15 Quiz £3 Family programs and quiz £3 Snakes Landers Invaders Machine code £5 Empire £4 Forth and Manual £10 Tel 08266 20126

DRAGON 32. Excellent condition complete with lots of good software joystick, manual books and magazines. Reliable tape recorder Issued over £1 250 Any reasonable offer around £250 considered Tel 0632 682964

DRAGON 32 Excellent condition £120 joystick and software negotiable price Tel Rayleigh Essex (0268) 774758

DRAGON 32. Four cassettes two joysticks Quite new £130 ono Tel 854 8092

DRAGON 32, pair joysticks lightpen dustcover £300 original software including Hi-res 51 x 24 screen manuals magazines, leads only £275 for quick sale A. C Durrant, 36 Hessle Mount, Headingley Leeds LS6 1EP

FOR SALE Dragon Enter the Dragon £4 25 programs for the Dragon 32 £3 60 Microdeal Planet Invasion £5 Spectrum Jumping Jack Hewson Consultants Heathrow £5 for both Tel Grimsby (0472) 853002

DRAGON software for sale 30 tapes, most popular titles £90 for the lot or £3 each Tel 0582 807 989 after 6 pm

DRAGON 32 with £300 worth of software + joystick share around £250 £10 of magazines Tel Sheffield 617619

DRAGON 32, under guarantee in good condition £100 of software two joysticks cassette recorder lots of business magazines light pen, sell for £170 Tel 01 794 7079 (evenings)

DRAGON 32 + £100 worth of software + manuals books + cassette recorder £150 Tel 0582 807989 (after 6 pm)

DRAGON 32 with joysticks + four games six weeks old, £135 Tel 267 0055 Mr Cavalla.



DRAGON 32 two joysticks machine edit and games books nine cassettes Donkey King Ghostrunner Dragon Trek Defenders etc Five months old boxed £175 worth £300 Tel 0772 311084 after 4 pm

DRAGON 32 six games including Donkey King Katerpillar two joysticks Excellent condition boxed with four magazines Cost over £260 will sell for £180 ono Tel Dunecare (STD code 038782) 385 after 6 pm

DRAGON 32, 4 months old joystick, cassette loader about £50 software + books £220 ono Tel 01-602 1071

Ataris for sale

ATARI 400 48K seven months old plus Basic cartridge manuals Atari 410 recorder joystick plus £100 software £175 Tel Huddersfield (0484) 683338

ATARI 800 Basic recorder joystick, game cartridge only 4 months old cassettes 4 books + 10 magazines (Analog Computel Page 5) worth £280 sell for £140 or swap + £150 for BBC B 1 2 OS Tel Leeds (0532) 7744 984

ATARI 800 COMPUTER, Basic cartridge + manuals and Star Raiders cartridge excellent condition only £100 ono Tel Berkswell (0676) 34012

ATARI 400, 16K 410 tape joysticks manuals basic Star Raiders Ghost Encounters others books key pad Tel Southend-on-Sea 525485 for details

ATARI VCS 17, cartridges joysticks also paddles £150 ono Tel Northwood 21503 after 6 pm

ATARI VCS COMBAT CARTRIDGE with joystick + paddle stick for £30 Tel 01 882 1345

ATARI 800 48K + 810 disk drive incl Basic manuals etc all perfect condition £2 000 worth games software free purchases £585 0484 884298

ATARI VCS, £48 cartridges Space Invaders Starmonster Demon Attack £15 Defender and Frogger £18 each Maze Craze Tennis £10 061 330 7118 after 6 pm.

ATARI VCS with Space Invader + Combat cartridge, £50 Tel 01-618 0787

ATARI 800 48K 410 PROGRAM RECORDER, £150 of games including Donkey King, Miner 2049 ER Defender other back-up cassettes, boxed worth £800 bargain for £310 Tel 01 560 0906 after 6 pm

ATARI VCS, excellent condition boxed + cartridges £60 ono Tel 01-804 4970

ATARI 800 16K BASIC CARTRIDGE + manuals + tape recorder + joystick + £220 of software and membership of Midland Games Library £230 ono Tel 0444-86 219

SELL BBC SOFTWARE, 14 games including Acornsoft Snooker Starship Command and Hopper Superior software Hunchback + Road Runner etc worth £120 sell for £50 Tel Mike 0272-684 740 evenings

APPLE 2 COMPUTER with 48K memory fully guaranteed boxed as new £613 sell for £380 Tel Peter 01 574 1653

APPLE 2 DISK DRIVE or compatible drive wanted! Tel 021 520 3817

APPLE 2 DISK DRIVE, silent type printer colour monitor + software all excellent condition £1,200 Chelmsford (0245) 263855 after 6 30 pm

ACORN ATOM, 12K Ram all leads + power supply manual over £40 software complete £115 ono Colour Acetronic console features Space Intruders Lazer Attack Olympics + twin joystick, very good condition £68 ono Tel 330 0189

ATARI 800, 48K 410 recorder basic lots of software and books plus joystick £240 Tel Southend (0702) 334174 any time

ATARI 800 48K plus books and lots of software Atari graphics by Compute De-re Atari and Technical Note Offers in region of £200 to £250 Tel Michael on Dewsbury (0924) 466704 for details after 7 pm

ATARI 800/800, original software music composer Rom master and generator disks Microsoft basic Mint condition Offers Tel (0702) 201 607

ATARI VCS plus joysticks paddles combat cartridge and manuals Excellent condition Still under guarantee £50 Atari VCS tidy two cartridges holder and dust cover £7 Empire Strikes Back catalogue £17 Phoenix cartridge £73 The lot for £85 Tel Woking (04862) 70516

ATARI VCS plus joystick paddles and three cartridges including Defender excellent condition four months old £75 ono Tel 041 632 8718 after 5 pm

ATARI 800 with Basic recorder three cassettes one cartridge four books 10 American magazines plus other magazines one joystick £280 £120 or swap for BBC Model B micro with 1 2 os plus cash £150 Tel (0532) 744934

ATARI 800 three months old one joystick and manual £330 Tel 01-680 7749 (after 7 pm)

ATARI PACMAN for £20 Tel 01-969 6392 after 6 pm

ATARI 800 48K, £40 software Accept £150 ono Tel 01 254 8456 (ask for Tony)

Acorns for sale

ACORN ATOM still boxed with power supply manual and program book, high resolution graphics extended memory £50 Tel 061-445 1863

BBC B SOFTWARE HALF PRICE Acorn Starship Hopper Kansas Pinball Arcade Cosmic Fighter P Power Killer Gorilla Moonbase Alpha Virgin Landfall Q/S Wizard Superior Alien Dropout Salamander Dragon Rider (or swap) Tel Bourne End 23544

COLOUR MONITOR for BBC microcomputer Medium resolution (price today £350+) Including fittings £220 Tel Warrington (0925) 54826

BBC MICRO MODEL B (OS 1.20) FIVE Acorn software tapes four programs power two bug byte plus four others Still boxed Hand posted to you £395 ono Tel Newcastle 0632 737654

BBC TWIN DISK DRIVE, 2x100K hardly used £210 Also Phoenix Amber mon for £60 Tel 0344 886175

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ACORN ATOM88 fully expanded 12 + 12 + utility Rom £50 of software will take BBC chip and word processor Latest model new cost £300 accept £110 ono Tel Crawley (0293) 29128 Mr Cutchess

BBC MICRO, unwanted gift 2 joysticks £30 Tel (01) 226 0127 eves only after 4 pm

BBC MICRO as new swap for Oric ZX81 £30 worth of software + joystick Tel 226 4127 Paul Skinback

BBC VIEW ROM with manuals boxed and £150 software sell complete for £85 01 574 4122 after 6 pm

Tandys for sale

BBC SOFTWARE large ... sale or swap Telephone for details (Bedfordshire) (0525) 370 438

VIDEO GENI, 16K + software + book + tv4 £183 ono Tel Lichfield 28855

BBC MODEL B 1 2 operating system + software magazines as new £355 Tel 01-866 0556 ext 288 (ask for R Wilkenson) daytime only

TANDY 32K COLOUR COMPUTER + some software £275 Tel Leyland 547 53 after 5 pm

BBC B + GP1 100A printer compatible tape recorder portable black/white tv all BBC Micro User issues + books, magazines £800 Tel 01 521 1068

Wanted

WANTED BBC B with/without disc interface disc drive and printer Tel Summers 0224 722906 or evenings/weekend 03363 273 (after October 30 036632 573)

WANTED ORDER FORM for microdrive Iain Thomson 21 Huntsmead Billericay Essex CM12 9JA

DRAGON 32 required £100 awaits each sound machine Postage collection arranged Full details please send to A Ellis 22 Turnavean Road St Austell Cornwall PL25 5BX

ATARI 16K CASSETTES for swap for any other Atari 16K cassettes or cartridges including Preppie Zaxxon Airstrike Crossfire Tel Northampton 22559 after 6 pm

A 48K SPECTRUM wanted in mint condition plus software and what have you! Tel 046 272423 (Mr Crowley)

DRAGON 32 machine code copies Must be able to copy auto run programs Will swap for software Tel 0222 586585 after 6 pm

WANTED VIC20 16K RAMPACK. Tel Coleshill 62057

WANTED ZX printer in working order can pay up to £10 Please ring 061 775 9958 and ask for Dave Will also give software to boost price

WANTED Vic20 Adventureland The Count and Voodoo Castle cartridges Tel 0558 822509 after 4 pm

SWAP electric organ with box and books worth £300 for colour home computer approximately equal value Tel Bedford 42543

WILL SWAP Spectrum 2 months old for BBC Model B and will pay the difference Tel 68266 ext 719

WANTED Spectrum 48K Tel Bolden 362315 after 5 pm

WANTED Eken quick-shot self centring joystick for Dragon 32 swap for 2 joysticks + software or any other self-centring joysticks Tel 0222 586485 after 6 pm

WANTED Spectrum ZX 16K or 48K any offers considered Tel 0952 611369

HAVE FOLLOWING to swap Sphinx Adventure Arcadians Rocket Raid Snapper Chess Killer Gorilla CW QSO and RTTY/QSO and Printel Multifile 3– Deep Space all complete with packing and paperwork swap BBC programs Cpl James Oswald 7 Signal Regiment BFPO 15

SWAP Spectrum Chess by Psion unused for Flight Simulator for Spectrum 48K Send with return sae to Smith 54 South End Road Rainham Essex RM13 7XJ

WANTED Spectrum 48K about £70 + extra for assembler monitor machine books Tel Tiverton (0884) 256118

WANTED Intelle Atari Consul cartridge willing to pay up to £10 each Tel 289 0775 (Patrick)

TI 99/4A JOYSTICK CASSETTE LEADS extended basic and speech synthesiser Tel Maidstone 47501 after 5 pm

SWAP ACETRONIC VIDEO GAME + five cartridges Microvision hand held game + four cartridges and a golf game All good condition for a 48K Spectrum Tel Epsom 23472 after 6 30 pm

WANTED SPECTRUM SOFTWARE for enthusiast Tel 0382 818813

VIC 20 SOFTWARE to swap Tel 0802 32 9528 (eves)

EXCHANGE SNOOKER TABLE 6ft by 3 ft plus cues balls for Spectrum Tel Leeds 653227 after 6 pm

WANTED FOR VIC 20 Submarine Commander Destroyer Gunfight Gridtrap Skyhawk Space Pirates For sale or swap Tomb of Drewan Chess Subspace Striker Tel 0283 27903 evenings

EXPERIMENTER wishes to buy computer parts I C s A Dc D As Rams TTLS etc Also dead dying computers Rampacks etc Write Dack 22 Bennington Square Vauxhall London SW5

48K COMPUTER WANTED Spectrum preferred with software Reasonable price Tel 01-828 5004

WANTED ZX81 1K Tel 06078 67620

WANTED Atari disk drive Also will swap Defender for other Atari cartridge Tel 051 724 5583

WANTED BBC or B micro computer Tel Tyneside 091 4868106 with details

WANTED BBC Model B Tel 01 248 1161

WANTED BBC micro model B 1 2 OS with guarantee if possible No software required Tel Sheerness (0795) 663816 after 6 pm Ask for Jason

WANTED Commodore 64 software including maths O level revision For sale or for swap Vic20 Mission Impossible Tel Northampton 402750 and ask for Robert

WANTED ZX80 Will offer £5 Tel Halifax 247111 after 6 pm

SWAP Vic20 cartridges Adventureland and Mission Impossible together for Forth cartridge cassette Write to C Robihard Air Movements Squadron RAF Wildenrath BFPO 42, West Germany

BENZERK cartridge for Dragon 32 swap for PacMan cartridge or cassette Tel 01 397 6946

ZX SPECTRUM 48K No software necessary Price required Tel (0582) 866398 Houghton Regis Near Luton

COMMODORE CASSETTE UNIT C2N required urgently Tel Joe 01 883 5675 evenings only

DRAGON 32 in exchange for Electron Commodore 64 or BBC micro Tel 01 574 0051

WANTED Tandy CGP 115 or equivalent for use with BBC micro Tel Rotherham 525813

WANTED Vic20 with cassette deck for beginners Tel 0424 224867

WANTED. Spectrum 48K with or without accessories or swap with an Atari which has Defender Combat Night Driver Space Invaders paddles joysticks and adaptor or sell for £80 ono Tel (0908) 815140

WANTED BBC B in good condition Tel Charles (0252) 721330

WANTED 16K ZX Spectrum in good condition with/without software, no cassette recorder wanted Will pay up to £70 Tel 0425 54271

SWAP Manic Miner Caterpillar machine code Meteor Storm Tranz AM worth £31 for Spectrum joystick or sell £3 50 each Write to William Mitchell Highmeot House Green Lane Welton Lincoln Tel Welton 60229

WANTED for Spectrum non working ZX printer physical or electronic fault irrelevant Also chipcheck or similar program Tel dam and price to Seaton Delaval 0632 372329 Can swap linear clampmeter

SWAP COMMODORE 64 software (originals only) Tel (0782) 850548 (Paul for details)

WANTED BBC model B Tel 0279 411360

WANTED COMMODORE 64 01 283 8111 ext 322 or 0885 54502

WANTED Good condition Doctor Who items for top quality Spectrum software with cash adjustment SAE with offer to Edward 9 Stanford Crescent Little Plumstead Norwich Norfolk NR13 5JL

I WILL SWAP Spectrum Trader or Spectres program for Flight Simulation or Pimania Telephone 0623 514890 or Paul Redington 51 Charnwood Street, Sutton in-Ashfield Notts

SWAP 48K SPECTRUM (August 83) in Fuller keyboard Kempston joystick interface tapes books cost £260+ for recent Vic20 with extras (want games!) Write M O Donnell 5 Worthington Close Runcorn, Cheshire

SWAP SPECTRUM or Dragon software Mainly interested in adventures Would like mysterious adventure series but anything considered

For sale

£70 DRAGON SOFTWARE at full price including Dragon selections 1 and 2 Chess (tape plus Rom) personal finance Will split I spouse Tel 0322 868926 (private sale)

10 CBM 64 GAMES Swap or ask (private sale) Tel 01 748 8178

LYNX 48K with all leads and manual plus PSU and introductory cassette boxes under guarantee £165 Tel 01-672 1738 anytime

SWAP Private Cove cartridge for any other adventure or Chopper Lifter Tel Epsom 25345 (private sale)

TANDY TRS80 Model I level 2 16K VDU cassette recorder three manual sel user group newsletters games plus magazines £150 one Tel 0785 823499

16K JUPITER ACE plus I/O port £70 will consider splitting Tel Rochdale 31089

INTELLIVISION, six months old immaculate plus five cartridges. £118 or exchange for Vic20 plus tape recorder Tel Nottingham (0602) 672015

WILL SWAP Adventurelands or Pirates Cove for any other adventure cartridge Tel Eveley 733360

CURRAH CHATTERBOX, brand new voice box for Vic20 two bought by mistake want £35 Tel 673-5818

ADVENTURELAND CARTRIDGE for Vic20 to swap for any other in the series Also Catcha Snatcha £4 Panic £3 50 Tel Wembley 2226

NIX DORF twin-head dot matrix printer (interfaced to Vic at present) swap for Commodore 64 or disc drive Delivery possible within reasonable distance Tel (Middlesbrough) 0642 585502

PRINTER, Tandy Lineprinter VII eight months old still boxed (similar to Seikosha GP100) Centronics and RS232 Interface Perfect condition ideal BBC Dragon Tandy £138 Tel Hemel Hempstead (0442) 62619 evenings

APPLE to Sentinx printer interface board £30 Tel 0378 70032.

8K UK 101, with Segmon monitor cased plus soundboard (and 32 x 48 level) Offers around £70 to £100 or swap and exchange for a Vic20 fine with Spectrum Tel Scarborough 863136

MATTEL INTELLIVOICE plus Space Spartans £30 other Intellivision cartridges £6 to £10 each Telephone for titles 0703 866775

TANGERINE MICRON 8K 15K Rom Basic toolkit tanbug ex-bug Ascii keyboard hexagon keyboard games keyboard chunky graphics manuals books software £250 one Tel 01-658 3326 after 6 pm

VIC20 GAMES Time Machine £4 The Goblin Baron £4 (8K) Llamasoft Lazer Zone £3 Tel Chris 0665 247838 (private sale)

CHOPLIFTER CARTRIDGER for sale (private) or swap for Jelly Monsters or Vic20 Tel 01 948 0507

ATARI VCS, two cartridges Combat and Laserblast, joysticks, pleased £60 ono Tel Canvey Island 699247

SHARP MZ80A, 48K + screen and tape recorder + standard tape pack age less than 6 months old £285 Tel 09367 4430 after 6 pm

ORIC 48K + software £9 + Cersery Challenge 9 £100 Fleetly Min Century + adventure cartridge £40 Tel N ge Hornchurch 57861 after 6 pm

TEXAS INSTRUMENT TI 59 programmable calculator master library + maths modules mains power supply + case all manuals + PC 100B print cradle magnetic cards + paper £253 ono Tel 0926 54118 after 6 pm

NEW BRAIN-AD + beginners manual and cassette unwanted gift usage minimal condition as new £230 Tel 0452 713788

SHARP MZ80A, 48K, with screen tape recorder less standard tape package less than 6 months old price £260 Tel 09367 4430 after 6 pm

SENO ORIGINAL ADVENTURE or Arcade games basic or machine code for any Spectrum good cash payments for wanted programs to Twilight Games Battle Hell Nurseries Liverpool Risen Hulton Preston Lancs

AMENTA Z80 DEVELOPMENT SYSTEM including power supply also manual £45 Tel 061 428 7312

TANDY COLOR COMPRITER 32K plus software £300 Tel Leyland 54753

16 UNEXPANDED VIC20 GAMES including Ski Run Pentagon etc for just £4 Tel Stourbridge 72121 (ask for Russell private sale)

BBC SOFTWARE VU-Calc VU-File music processor (QS) Forth Hardly used £10 each or will swap Also some games available Tel Watford 46955

BBC PROGRAM EXCHANGE, swap Kansas Galactic Firebird or Acornsoft Planetoid for Program Power Escape From Moonbase Alpha or Superior software Q*Bert or others Tel Hornchurch 71763

DO YOU HAVE BBC SOFTWARE that needs a printer to run but you don't have one? Let me send tape and £2 PO and information SAE Runkle 80 Longmeadow Frimley Surrey

SURPLUS 6502 CPU 6845 CRTC + data 8255 PPIA 2114 2off Cost £18+ will accept £12 the lot W Ireland, 113 Bradfield Road Urmston Manchester Tel 061-865 5609

SWAP VOODOO CASTLE (VIC20) for Adventureland or Mission Impossible cartridge Tel Derby (0332) 363225 (after 4 pm ask for Andrew)

NEWBRAIN MODEL AD five months old complete with original packing and all leads 19 months guarantee to run £200 ono or swap for BBC B in good working order Telephone Bredfens 2909

TRS80 model 1 LII video and cassette deck software and books £220 ono Tel 01-680 1893 (after 6 pm)

ARCADIA, Pssst Horace goes skiing for sale £8 Tel Lower Peover 2095

VIC20 Adventureland £8 or swap for other cartridge or 3 16K adventures. Tel 0908 542432 Sunday only

SWAP ACORN SOFT ROCKET RAID or Planetoys for A & F painter for BBC or buy for £4 Tel 01-204 4534 (evenings private sale)

VIDEO GENIE, 16K Parallel printer interface sound cassette recorder manuals, leads books and magazines Worth £970 Will sell for £130 ono Tel 0865 55686

GALAXIAN PUB GAME, no cabinet £200 ono Tel Whitney (0993) 75478

DAI 48K 16 colour high res graphics user magazines £450 ono Tel 670 5609

COLECOVISION TV GAME expansion module 2 turbo driver £150 ono Tel Bristol 643568 (after 4 30 pm)

SWAP 5 volumes Knack magazines for any Vic20 add ons Tel 832 5663

VIC20 Adventureland cartridge swap for another adventure or private sale for 27£ Tel 0203 348759

SWAP VIC20 cartridge The Count for Gorf Tel Oundle 72056 (ask for Dominic)

VIC20 software to sell and swap Tel 01-467 8589 (private sale)

MISSION IMPOSSIBLE CARTRIDGE will swap for Vudu Castle or The Count Tel 021-353 6163

ORIC 1 48K, £90 ono Tel Nottingham 224066

ZX81, 16K proper keyboard £40 worth of software very good condition £70 ono Tel 01 998 3556

ADVENTURE HELPLINE

Micro *BBC B*
Adventure *Sphinx Adventure*
Problem *Where is the bun*
Name *Steven Wood*
Address *Lucan Arms Staines Road Laleham Middlesex*

Micro *ZX Spectrum 48K*
Adventure *The Hobbit*
Problem *How can I get back after collecting the treasure? If there isn't a way then how do I get the treasure?*
Name *Martin Peapell*
Address *61 Whitworth Road Swindon Wilts SN2 3BQ*

Micro *Dragon 32*
Adventure *Ring of Darkness (Wintersoft)*
Problem *(1) How to get the key from the Jester (2) How to cross the water and get to the islands*
Name *Anthony Cody*
Address *46 Willow Grove Old Stratford Milton Keynes MK19 6AZ Tel (0908) 564006*

Micro *ZX Spectrum*
Adventure *The Hobbit*
Problem *I can't escape the elves (red) dungeon to get on in the adventure. I have ring and last score was 17 5%*
Name *S McCann*
Address *110 Ednaston Drive Linwood Paisley Renfrewshire PA3 3TE*

Micro *BBC B*
Adventure *Sphinx Adventure*
Problem *I would like to know how to get past the dragon Any help would be gratefully received*
Name *Adam Neale*
Address *3 Welton Road Daventry Northants*

Micro *Sinclair Spectrum 48K*
Adventure *Espionage Island*
Problem *After getting out of the plane how do you get past the guard native woman or over the overbed? Do any items help?*
Name *Andrew Whiteside*
Address *Greystoke 16 Crossdale Drive Clitheroe Lancs BB7 1LQ*

Micro *Spectrum*
Adventure *Planet of Death*
Problem *(1) Is there any way out of prison? (2) I can weaken the F F but dancing goes to prison (3) Can't get your decoding program to run*
Name *A F Brown (Tony)*
Address *16 Lushington Avenue Kirby Cross Frinton-on Sea Essex CO13 0RF*

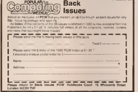
Micro *Spectrum 48K*
Adventure *Espionage Island*
Problem *I can't get out of the swamp I've tried everything I can think of with everything I've got no luck*
Name *The Black Iris*
Address *62 Park Street Newhall Burton-on-Trent Staffs DE11 0JJ*

Micro *Spectrum 48K*
Adventure *Hobbit*
Problem *I can get to spiders nest by barn or through magic door but cannot find anything useful there. What is there?*
Name *Matthew Turner*
Address *5 Bradshaw Road Marple Stockport Cheshire SK6 6PF*

Micro *Spectrum 48K*
Adventure *Hobbit*
Problem *I cannot return after killing Smaug and collecting gold I keep on being killed by pale bulbous eyes*
Name *Matthew Turner*
Address *5 Bradshaw Road Marple Stockport Cheshire SK6 6PF*


NOW!! DELTAS FOR DRAGONS
The smooth control of a Voltmace DELTA sprung [illegible] joystick is now available to Dragon owners. Called the DELTA 3D it is a cut down version of our DELTA 14B handset. The same robust ball and socket jointed joystick but with the keypad blanked off to leave a choice of one of three fire buttons.
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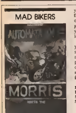



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NEW RELEASES

MAD BIKERS



From time to time Automata takes a break from its wacky adventures to release something more conventional Well perhaps conventional is the wrong word to describe *Morris meets the Bikers* but it is an arcade-style game

You must move your Morris Minor through the various levels of a multi-storey car park Avoid obstacles like tin tacks and parking fees whilst collecting the 10 golden coins you will need to pass through the exit toll gate onto the next screen

All the while you are harassed by vicious bikers who will do something nasty but non-violent (this is Automata remember) to you if you stray into their path But what about the traditional song on the reverse of the tape I hear you cry Well it's a version of that old tear jerker *Leader of the Pack*, quite unlike any you've heard before

Program *Morris meets the Bikers*
Price *£6*
Micro *Spectrum 16/48K*
Supplier *Automata*
27 Highland Road
Portsmouth
Hants PO4 9DA

PRICELESS

Digital Fantasia has issued a number of adventures for the Spectrum and the BBC

The adventures adopt *The Hobbit* format of a split screen, showing both graphics and text for each scene, though there is an option to dispense with the graphics

The Golden Baton requires you to recover a priceless artifact belonging to king Ferreoul. This involves an epic journey across many lands as you unravel the various problems that beset you

When you begin you find yourself in a kind of forest, searching around you will find a hut and soon afterwards a puzzle to solve involving a crab and a slug I can say no more (actually I didn t get any further)

Program *The Golden Baton*
Price *£9 95*
Micro *Spectrum 48K*
Supplier *Digital Fantasia*
24 Norbreck Road
Norbreck
Blackpool
Lancs FY5 1RP

BILLS

With the chill winds of winter howling through every nook and cranny, now could be a good time to invest in *Cut Your Heating Bills* by Brane Software

The program for the Spectrum 48K calculates the bill for heating your home and will point out areas that it could be worth insulating It can also be used as a what if' model eg 'what if I insulate the roof' etc

A good idea that may actually be useful The instructions are well written too

Program *Cut Your Heating Bills*
Price *£7 95*
Micro *Spectrum 48K*
Supplier *Brane Software*
Myrtle Grove
Brane
Sancreed
Penzance TR20 8RE

CROCODILES

Thorn EMI has recently released its first titles for the Spectrum having previously concentrated on the Commodore and Atari computers

River Rescue was very successful when first released on the Vic The Spectrum version is said to be true to the original

The object of the game is to navigate down a river avoiding obstacles like islands sandbanks and crocodiles to pick up explorers and transport them safely away

As you rescue more explorers, things hot up with nameless rivals buzzing you with planes and dropping mines into the water Very addictive

Program *River Rescue*
Price *£7 00 (approx none recommended)*
Micro *Spectrum 48K*
Supplier *Thorn EMI*
Thorn EMI House
Upper St Martin s Lane
London WC2H 9ED

ADVENTURE

The Quest of Merravid is an Adventure game for the 16K Vic and the Commodore 64 — both versions on the same tape

Martech, who have issued this game, are the company that experimented with computer board games with *Conflict* and *Galaxy Conflict* In a way (since I very much liked those games) it's a shame they have issued a conventional program this time

The Quest of Merravid allows for fairly sophisticated sentences like the Artic adventures — up to nine words in any sentence

Your task is to retrieve the lost firestone of the Dwarfs (a Brownie point to the first company sending me an adventure in which you have to get rid of something) and the whole paraphernalia of goodies and baddies swords, sorcery and Dragons as well as much humour, lurk within

Program *The Quest of Merravid*
Price *£7 95*
Micro *Vic20 (16K)/*
Commodore 64
Supplier *Martech Games*
9 Dillingburgh Road
Eastbourne
Sussex BN20 8LY

QUEST

Labyrinth of the Snappers is described as a cross between *Pacman* and a mini-adventure

You must search for seven fragments of the Orb of Zilron which are hidden in money bags scattered around a maze

To help you in the Quest there are various objects hidden in the maze

The *Pacman* element comes in the form of the Snappers who will chase you when they break out of their den

Program *Labyrinth of the Snappers*
Price *£4 50*
Micro *Oric 1*
Supplier *P W Products*
8 Ravensdale Avenue
Leamington Spa
Warwickshire
CV32 6NQ

FRUITLESS



Purple Turtles is intended for young children — I loved it

You move a little man back and forth across a river collecting fruit using some rare purple turtles as stepping stones The problem is that from time to time the turtles decide to take a dive leaving the little man wet and fruitless

As the game progresses the turtles start to bob up and down with greater frequency

Very addictive with beautiful graphics

Program *Purple Turtles*
Price *£7 95*
Micro *Commodore 64*
Supplier *Quicksilva*
Palmerston Park House
13 Palmerston Rd
Southampton SO1 1LL

UTILITY

Whilst packages like the *Games Designer* from Quicksilva allow for the simple creation of customised games they are necessarily limited to a number of standard formats

Scope is a Forth-like language specially designed for the manipulation of graphics smoothly and at speed

Although *Scope* commands are written in Basic *Rem* statements these are then compiled to give machine code speed of execution Essentially the program gives you a language which though no more difficult to learn than Basic, is very much faster

Not perhaps a program for the complete beginner but nevertheless one of the most interesting utility packages I've seen yet for the Spectrum

Program *Scope*
Price *£11 95*
Micro *Spectrum 48K*
Supplier *I S P*
Crown House
38b High Street
Godalming
Surrey

GRUBBERS

Doom Bugs is an excellent new game from Work Force Using graphics equal to anything Quicksilva has produced it has managed to produce an original and addictive game

Tarant Tula is the name of your hero, a charming insect entombed in the lair of the grubbers — nasty slug-like things that constantly develop until they become vicious red beetles

You can escape by eating from the grubbers supply of honey and biting your way through a sealed trapdoor — beyond it lies a maze and more lairs Naturally as you progress it all gets more and more difficult

Program *Doom Bugs*
Price *£5 50*
Micro *Spectrum 16/48K*
Supplier *Work Force*
140 Wallsden Ave
Luton
Beds

STUNNING

Zalaga is a new space attack game for the BBC (32K) from Aardvark Software

Although basically a shoot em up game it is supposed to be the fastest and most addictive yet devised for the BBC

The various waves of aliens all behave differently and so require different tactics Aardvark also maintain that the keyboard responses are faster than in any other game, that the colours are more impressive and the sound effects more stunning

I was impressed by the way the cover blurb shows you how to get a proper display from your BBC utilising the whole screen Obviously some care has been taken

Program *Zalaga*
Price *£6 90*
Micro *BBC (32K)*
Supplier *Aardvark Software*
100 Ardleigh Green Road
Hornchurch
Essex RM11 2LG

PACKAGE

Onward goes the Vic20 and onward go the games packs Regular readers of New Releases will know of my low opinion of games packs, but since a whole new group of people will be buying Vics for Christmas and will be looking for a few games to play it is perhaps worth mentioning *Survival* by Avalon Computing

At least the games in the *Survival* pack look as if some thought and effort has gone into them even though the themes Mazeman Bomber etc, are the same old weary ones

Program *Survival*
Price *£5 99*
Micro *Vic20*
Supplier *Excalibur Software*
Avalon Computing
14 Cliff Road
Hornsea
North Humberside
HU18 1LL

BRIBE

Strategy games have taken many forms and themes — Airlines Kingdoms Shipping Banana Republics and now *Gangsters*

Cases Computer Simulations specialises in producing strategy games chiefly for the Spectrum *Gangsters* is its latest release

The objective of *Gangsters* is to take over the city from other gang leaders and retain your grip on its illegal activities You will need a large gang to protect you from your vicious rivals and the police

As you accumulate money you may be able to bribe the police or put out contracts on particular individuals who hinder your rise to power Unscrupulous types should love it

Program *Gangsters*
Price *£6 00*
Micro *Spectrum 48K*
Supplier *Cases Computer Simulations*
14 Langton Way,
London SE3 7TL

AIRLINE



High Flyer is a sophisticated management game from Commodore The aim is to successfully run an airline over 40 years just like in the real world, it s no easy task

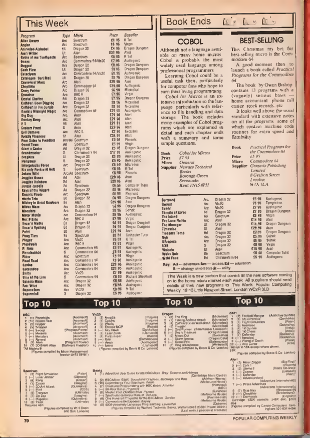
Most factors which would affect business in the real world have been included like your popularity among the public and the opinion of the banks

With various graphic displays including maps and financial reports *High Flyer* is more complex than the conventional game of this type and is likely to take a long time to play — hence it can be saved on to disc

One point though are you allowed to declare yourself a national airline, form a cartel and lose fortunes whilst overcharging people without going broke?

Program *High Flyer*
Price *£14 95*
Micro *Commodore 64 (disc)*
Supplier *Commodore*
67a Ajax Avenue
Slough
Berkshire SL1 4BJ

New Releases is designed to let people know what software is coming on to the market If you have a new game or utility which you are about to release send a copy and accompanying details to New Releases Popular Computing Weekly 12 13 Little Newport Street London WC2R 3LD



This Week

Program	Type	Micro	Price	Supplier
Alien Swarm	Arc	Spectrum	£6.95	K Tel
Angler	Arc	Spectrum	£5.95	Virgin
Animated Alphabet	Ed	Dragon 32	£4.95	Dragon Dungeon
Atari Writer	Ut	Atari	£29.95	Atari
Bathe of the Toothpaste	Arc	Spectrum	£5.95	K Tel
Beans	Arc	Commodore 64/Vic20	£7.95	Audiogenic
Bugged	Arc	Dragon 32	£8.95	Dragon Dungeon
Cash Flow	Ut	Dragon 32	£9.95	Dragon Dungeon
Cataclysm	Arc	Commodore 64/Vic20	£8.95	Audiogenic
Catalogue Sort Mail	Ut	Dragon 32	£9.75	Dragon Dungeon
Caverns of Mars	Arc	Atari	£29.95	Atari
Choplifter	Arc	Commodore 64	£29.95	Audiogenic
Crazy Painter	Arc	Dragon 32	£6.90	Microdeal
Cruncher	Arc	BBC B	£7.95	Virgin
Crystal Chalice	Ad	Dragon 32	£7.95	Dragon Dungeon
Cuthbert Goes Digging	Arc	Dragon 32	£8.95	Microdeal
Cuthbert in the Jungle	Arc	Dragon 32	£8.95	Microdeal
David's Midnight Magic	Arc	Commodore 64	£29.95	Audiogenic
Dig Dug	Arc	Atari	£29.95	Atari
Donkey Kong	Arc	Atari	£29.95	Atari
E T	Ad	Atari	£29.99	Atari
Eastern Front	S	Atari	£29.95	Atari
Evil Demons	Arc	BBC B	£7.95	Excalibur
Family Finances	Ut	Atari	£24.95	Atari
Four Gates to Freedom	Arc/Ad	Spectrum	£6.95	Phoenix
Ghost Town	Ad	Spectrum	£5.95	Virgin
Giant's Castle	Ad	Dragon 32	£5.95	Dragon Dungeon
Grandmaster	S	Commodore 64	£17.99	Audiogenic
Graphics	Ut	Dragon 32	£8.95	Audiogenic
Hangman	S	Dragon 32	£5.95	Audiogenic
Intergalactic Force	Arc	Dragon 32	£8.00	Microdeal
It's only Rock and Roll	S	Spectrum	£6.95	K Tel
Jokers Wild	Arc/Ad	Spectrum	£6.95	Phoenix
Juggles House	Ed	Atari	£29.95	Atari
Juggles Rainbow	Ed	Atari	£29.95	Atari
Jungle Jumble	Ed	Spectrum	£6.95	Computer Tutor
Keys of the Wizard	Ad	Dragon 32	£8.95	Microdeal
Kosmic Pirate	Arc	Spectrum	£5.95	Elephant
Mania Trio	Ed	Dragon 32	£9.95	Dragon Dungeon
Mickey in Great Outdoors	Ed	Atari	£29.95	Atari
Mines Maze	Arc	Dragon 32	£4.95	Dragon Dungeon
Monsters	Arc	Dragon 32	£8.95	Softek
Motor Mania	Arc	Commodore 64	£8.95	Audiogenic
Mr. & Mrs.	Arc	BBC B	£7.95	Virgin
Oscar's Maths	Ed	Dragon 32	£4.95	Dragon Dungeon
Oscar's Spelling	Ed	Dragon 32	£4.95	Dragon Dungeon
Paint	Ut	Atari	£29.95	Atari
Pony Tiles	Ed	Spectrum	£6.50	Computer Tutor
Plague	Arc	Vic20	£6.95	K Tel
Plankwalk	Arc	BBC B	£7.95	Virgin
R. Hole	Arc	Commodore 64	£8.95	Audiogenic
Renaissance	S	Commodore 64	£8.95	Audiogenic
Rider	Arc	Spectrum	£5.95	Virgin
Road Toad	Arc	Commodore 64	£8.95	Audiogenic
Sanina	Arc	Commodore 64	£29.95	Audiogenic
Serpentine	Arc	Commodore 64	£29.95	Audiogenic
Shifty	Arc	Vic20	£7.95	Audiogenic
Ship of the Line	S	Commodore 64	£9.50	Richard Shepherd
Spiders Maze	Arc	Dragon 32	£5.95	Audiogenic
Star Warp	Arc	Dragon 32	£6.95	Audiogenic
Sepavators	Arc	Vic20	£6.95	K-Tel
Supermind	S	Dragon 32	£5.95	Audiogenic
Surround	Arc	Dragon 32	£5.95	Audiogenic
Swarm	Arc	Vic20	£6.95	Temptation
Teddy	Arc	Vic20	£7.95	Audiogenic
Temple of Zeros	Ad	Dragon 32	£7.95	Dragon Dungeon
The Island	Ad	Spectrum	£5.95	Virgin
The Lone Raider	Arc	Atari	£14.95	Atari
The Manager	Ut	Dragon 32	£14.95	Dragon Dungeon
Timewise	Ut	Atari	£29.95	Atari
Treasure Tomb	Ad	Dragon 32	£7.95	Dragon Dungeon
Ugh	Arc	Dragon 32	£5.95	Softek
Ultrageda	Arc	Dragon 32	£6.95	Softek
UXB	S	Dragon 32	£6.95	Virgin
Visicalc	Ut	Atari	£15.95	Atari
Whiz Quiz	Ed	Spectrum	£5.95	Computer Tutor
Wold Food	Ed	Commodore 64	£5.95	Audiogenic

Key: Ad — adventure/Arc — arcade, Ed — education, S — strategy simulators Ut — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to This Week, Popular Computing Weekly 12/13 Little Newport Street, London WC2R 3LD

Book Ends

COBOL

Although not a language available on many home micros Cobol is probably the most widely used language among professional programmers

Learning Cobol could be a useful task then, particularly for computer fans who hope to earn their living programming

Cobol for Micros is an extensive introduction to the language particularly with reference to file handling and data storage. The book includes many examples of Cobol programs which are explained in detail and each chapter ends with a summary and some simple questions.

Book *Cobol for Micros*
Price *£7.95*
Micro *General*
Supplier *Newnes Technical Books, Borough Green, Sevenoaks, Kent TN15 8PH*

BEST-SELLING

This Christmas my bet for best-selling micro is the Commodore 64

A good moment then to launch a book called *Practical Programs for the Commodore 64*

The book by Owen Bishop contains 13 programs with a (vaguely) serious basis — home accountant, phone call coster, stock records, etc

It looks well above the usual standard with extensive notes on all the programs, some of which contain machine code routines for extra speed and flexibility

Book *Practical Programs for the Commodore 64*
Price *£5.95*
Micro *Commodore 64*
Supplier *Granada Publishing Limited, 8 Grafton Street, London W1X 3LA*

Top 10

BBC

1 (1) Planetoids (Acornsoft)
2 (10) Rocket Raid (Acornsoft)
3 (3) Hopper (Acornsoft)
4 (5) Snapper (Acornsoft)
5 (—) Swoop (Program Power)
6 (—) Meteors (Acornsoft)
7 (—) Monsters (Acornsoft)
8 (—) Reversi (Acornsoft)
9 (9) Alien (Program Power)
10 (7) 3D Brain Alley (Software Invasion)

*All Models B

(Figures compiled by Micro Management Ipswich 0473 59181)

Vic20

1 (2) Arcadia (Imagine)
2 (4) Catcha (Imagine)
3 (3) Wacky (Imagine)
4 (8) Escape MCP (Rabbit)
5 (—) Sky Hawk (Quicksilva)
6 (5) Laser Zone (Llamasoft)
7 (3) Paratrooper (Rabbit)
8 (—) Gate (Commodore)
9 (—) Amok (Audiogenic)
10 (—) Matrix (Llamasoft)

(Figures compiled by Boots & Co London)

Dragon

1 (3) The King (Microdeal)
2 (1) Talking Android Attack (Microdeal)
3 (4) Cuthbert Goes Walkabout (Microdeal)
4 (5) Frogger (Microdeal)
5 (—) Grid Runner (Salamander Llamasoft)
6 (—) Ring's Treasure (Dragon Data)
7 (2) Mined Out (Quicksilva)
8 (—) Storm Arrows (Dragon Data)
9 (—) Grand Prix (Salamander)
10 (6) Ring of Darkness (Wintersoft)

(Figures compiled by Boots & Co London)

ZX81

1 (2) Football Manager (Addictive Games)
2 (6) QS Scramble (Quicksilva)
3 (1) Flight Simulation (Psion)
4 (5) Asteroids (Quicksilva)
5 (4) 1K Games (Artic)†
6 (3) 1K Chess (Artic)†
7 (7) Defender (Quicksilva)
8 (—) Invaders (Quicksilva)
9 (—) Planet of Death (Psion)
10 (—) Inca Curse (Artic)

All run in 16K except where shown. †1K.

(Figures compiled by Boots & Co London)

Spectrum

1 (3) Flight Simulation (Psion)
2 (—) Lunar Jetman (Ultimate)
3 (8) Kong (Ocean)
4 (1) Zzoom (Imagine)
5 (—) 3D Ant Attack (Quicksilva)
6 (—) Print (CDS)
7 (6) Tranzam (Ultimate)
8 (7) Zip Zap (Imagine)
9 (—) Bugaboo (Quicksilva)
10 (8) Pssst (Ultimate)

Requires 48K

(Figures compiled by W H Smith and Son London)

Books

1 (1) Adventure User Guide for the BBC Micro. Bray, Dickens and Holmes (Cambridge Micro Centre)
2 (2) BBC Micro Basic Sound and Graphics. McGregor and Watt (Addison Wesley)
3 (10) Supercharge Your Spectrum. Bassin (Melbourne House)
4 (7) Structured Programming with BBC Basic. Atherton (Horwood)
5 (—) 30-Hour Basic. Prigmore (NEC)
6 (8) Master Your ZX Microdrive. Pennell (Sunshine)
7 (—) Spectrum Hardware Manual. Dickens (Melbourne House)
8 (9) One Hundred Programs for the BBC Micro. Gordon (Prentice-Hall)
9 (—) Commodore 64 Exposed. Bayley (Melbourne House)
10 (3) 6809 Assembly Language Programming. Leventhal (Osborne)

(Figures compiled by Watford Technical Books, Watford 0923 23584 Prestel 206441)
(Last week's position in brackets)

Atari

1 (3) Miner 2049er (Big Five)*
2 (—) Zork 1 (Infocom)
3 (2) Ultima II (Sierra On-line)‡
4 (—) Zaxxon (Datasoft)
5 (—) Defender (Atari)*
6 (—) Adventureland (Adventure International)‡
7 (—) Pirate Adventure (Adventure International)‡
8 (1) Blue Max (Showcase)§
9 (—) Choplifter (Broderbund)
10 (—) Diamonds (English)‡

Cartridge †32K cassette ‡48K disc §48K disc

(Figures compiled by Carlos Computers Birmingham 021-632 4458)



Ziggurat

The state of the art

If as now seems possible the micro-computer boom is over then the rate of growth of the numbers of new computers being bought in the country will begin to decrease

Even so the number of computers will still increase but at a slower rate (a similar confusion exists with inflation the rate of inflation may decrease but this still means increasing prices)

Which are the companies and individuals at risk? Once we start asking these questions we enter familiar territory (at least familiar to some) — questions about the behaviour of organisations in a competitive market.

For a moment just consider the smaller company These days even Dragon or Oric are small companies but let us start with the very smallest companies The companies which are effectively two or three individuals perhaps employing a handful of others

For such a company to all successful it helps to have entered the market early Then there were fewer firms and profits were there to be made not because there was no competition

In some cases these beginners have continued to do well but those people who were there in the beginning were only there by chance

An ability to program or to design a computer does not necessarily imply a more general ability to run a business In the beginning an ability to program was far more important than an ability to run a business — the pickings were so easy that many companies prospered which would not have otherwise succeeded in a more competitive market.

As pickings were so much easier businesses could prosper despite poor management. As soon as the market became tighter poor management — which usually meant poor financial management — had its inevitable effects firms began to suffer problems Couple poor financial management with projections based on incorrect assumptions and firms began to overproduce for markets that were never to be

Many firms were no more than associations of programmers whose main delight was in the programming — as a result much of the back up and documentation was poor I remember ringing up one software house (a group of science students) and criticising their software documentation The response from the person at the other end was that it was X's fault, not his, and what did a few spelling mistakes matter? Many of the smaller firms which have folded have attitudes like these The successful ones (and by 'successful' I do not necessarily mean 'largest') are run by persons with a wider perspective and experience

The big companies — Texas Atari Mattel — have the same problems and more Sometimes they stem from over supply (after all the population is not infinite) Sometimes the problems have come from the expansion in the number of firms supplying computers (each of which might be over-estimating) Sometimes it is because the company is saddled with an image which made sense at one time (eg a 'games' image) but now is counter-productive Sometimes the state-of-the-art has advanced leaving the company with an out-dated over priced product.

More often than not it is all of these plus some more

The point is simple In the past, the market was undiscriminating enough, and hungry enough to support even the poorly run or less than top-quality product companies That is changing as the market matures Just as the winners are becoming more obvious so the losers are too And it is the losers that are now being weeded out ■

Boris Allan

Puzzle

Squares within squares

Puzzle No 80

Some numbers which are integer squares, such as 49 (7 × 7), are made up of two further integer squares, in the case 4 and 9

Other such numbers are 169 (16 and 9) 361 (36 and 1), 1225 1444 1681

What is the next number? (Note that √00 is not 0)

Solution to Puzzle No 76

This puzzle can be solved quite easily without using a computer — in fact using a micro would almost certainly take longer than solving it by inspection

Knowing the total catches of each pair of twins all the possible combinations can be written down Combinations of two equal numbers can be eliminated since no two people caught the same number of fish

Robinsons (Tot 17)	— 10+7 or 9+8
Smiths (Tot 16)	— 10+6 or 9+7
Taylors (Tot. 9)	— 8 +1 or 7+2 or 6+3 or 5+4
Unwins (Tot 7)	— 6 +1 or 5+2 or 3+4
Venn-Wilkinsons (Tot. 6)	— 5+1 or 4+2

Since the ten twins each caught a different number of fish the correct combination can be chosen from the list above just by looking (shown in italics)

Liz (8) and Isambard (9) Robinson
Julie (6) and Jill (10) Smith
Gus (7) and Bertram (2) Taylor
Charles (3) and Donald (4) Unwin
Lynne (1) and Eric (5) Venn-Wilkinson

Winner of Puzzle No 76

The winner is Linda Doyle Norfolk Crescent, Sidcup, Kent who receives £10